National Aeronautics and
Space Administration
Langley Research Center

Scientific and Technical
Information Program Office

Scientific and Technical Aerospace Reports

STAR

Volume 42 Issue 8

April 23, 2004

WHAT'S INSIDE

- NASA STI Program Overview
- Introduction
- NASA STI Availability Information
- Table of Contents
- Subject Term Index
- Personal Author Index

NASA STI Program ... in Profile

Since its founding, NASA has been dedicated to the advancement of aeronautics and space science. The NASA Scientific and Technical Information (STI) Program plays a key part in helping NASA maintain this important role.

The NASA STI Program provides access to the NASA Aeronautics and Space Database, the largest collection of aeronautical and space science in the world. The STI Program is also NASA's institutional mechanism for disseminating the results of its research and development activities. These results are published by NASA in the NASA STI Report Series, which includes the following report types:

- TECHNICAL PUBLICATION. Reports of completed research or major significant phases of research that present the results of NASA programs and include extensive data or theoretical analysis. Includes compilations of significant scientific and technical data and information deemed of continuing reference value. NASA counterpart of peer-reviewed formal professional papers, but has less stringent limitations on manuscript length and extent of graphic presentations.
- TECHNICAL MEMORANDUM. Scientific and technical findings that are of preliminary or specialized interest, e.g., quick release reports, working papers, and bibliographies that contain minimal annotation. Does not contain extensive analysis.
- CONTRACTOR REPORT. Scientific and technical findings by NASA-sponsored contractors and grantees.
- CONFERENCE PUBLICATION. Collected papers from scientific and technical conferences, symposia, seminars, or other meetings sponsored or co-sponsored by NASA.
- SPECIAL PUBLICATION. Scientific, technical, or historical information from NASA programs, projects, and missions, often concerned with subjects having substantial public interest.
- TECHNICAL TRANSLATION. English-language translations of foreign scientific and technical material pertinent to NASA's mission.

Specialized services that help round out the STI Program's diverse offerings include creating custom thesauri, building customized databases, organizing and publishing research results ... even providing videos.

The NASA STI Program is managed by the NASA STI Program Office (STIPO). STIPO is the administrative office at Langley Research Center for the NASA STI Program.

For more information about the NASA STI Program, you can:

- Access the NASA STI Program Home Page at http://www.sti.nasa.gov
- E-mail your question via the Internet to help@sti.nasa.gov
- Fax your question to the NASA STI Help Desk at (301) 621-0134
- Telephone the NASA STI Help Desk at (301) 621-0390
- Write to:
  NASA STI Help Desk
  NASA Center for AeroSpace Information
  7121 Standard Drive
  Hanover, MD 21076-1320

Introduction

Scientific and Technical Aerospace Reports (*STAR*) is an online information resource listing citations and abstracts of NASA and world wide aerospace-related STI. Updated biweekly, *STAR* highlights the most recent additions to the NASA Aeronautics and Space Database. Through this resource, the NASA STI Program provides timely access to the most current aerospace-related Research & Development (R&D) results.

STAR subject coverage includes all aspects of aeronautics and space research and development, supporting basic and applied research, and application, as well as aerospace aspects of Earth resources, energy development, conservation, oceanography, environmental protection, urban transportation and other topics of high national priority. The listing is arranged first by 11 broad subject divisions, then within these divisions by 76 subject categories and includes two indexes: subject and author.

STAR includes citations to Research & Development (R&D) results reported in:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institution, universities, and private firms
- Translations
- NASA-owned patents and patent applications
- Other U.S. Government agency and foreign patents and patent applications
- Domestic and foreign dissertations and theses

The NASA STI Program

The NASA Scientific and Technical Information (STI) Program was established to support the objectives of NASA's missions and research to advance aeronautics and space science. By sharing information, the NASA STI Program ensures that the U.S. maintains its preeminence in aerospace-related industries and education, minimizes duplication of research, and increases research productivity.

Through the NASA Center for AeroSpace Information (CASI), the NASA STI Program acquires, processes, archives, announces and disseminates both NASA's internal STI and world-wide STI. The results of 20th and 21st century aeronautics and aerospace research and development, a worldwide investment totaling billions of dollars, have been captured, organized, and stored in the NASA Aeronautics and Space Database. New information is continually announced and made available as it is acquired, making this a dynamic and historical collection of value to business, industry, academia, federal institutions, and the general public.

The STI Program offers products and tools that allow efficient access to the wealth of information derived from global R&D efforts. In addition, customized services are available to help tailor this valuable resource to meet your specific needs.

For more information on the most up to date NASA STI, visit the STI Program's website at http://www.sti.nasa.gov.

NASA STI Availability Information

NASA Center for AeroSpace Information (CASI)

Through NASA CASI, the NASA STI Program offers many information products and services to the aerospace community and to the public, including access to a selection of full text of the NASA STI. Free registration with the program is available to NASA, U.S. Government agencies and contractors. To register, contact CASI at help@sti.nasa.gov. Others should visit the program at www.sti.nasa.gov. The 'search selected databases' button provides access to the NASA Technical Reports Server (TRS) – the publicly available contents of the NASA Aeronautics and Space Database.

Each citation in *STAR* indicates a 'Source of Availability'. When CASI is indicated, the user can order this information directly from CASI using the STI Online Order Form or contact help@sti.nasa.gov or telephone the CASI Help Desk at 301-621-0390. Before ordering you may access price code tables for STI documents and videos. When information is not available from CASI, the source of the information is indicated when known.

NASA STI is also available to the public through Federal information organizations. NASA CASI disseminates publicly available NASA STI to the National Technical Information Service (NTIS) and to the Federal Depository Library Program (FDLP) through the Government Printing Office (GPO). In addition, NASA patents are available online from the U.S. Patent and Trademark Office.

National Technical Information Service (NTIS)

The National Technical Information Service serves the American public as a central resource for unlimited, unclassified U.S. Government scientific, technical, engineering, and business related information. For more than 50 years NTIS has provided businesses, universities, and the public timely access to well over 2 million publications covering over 350 subject areas. Visit NTIS at http://www.ntis.gov.

The Federal Depository Library Program (FDLP)

The U.S. Congress established the **Federal Depository Library Program** (FDLP) to ensure access by the American public to U.S. Government information. The program acquires and disseminates information products from all three branches of the U.S. Government to nearly 1,300 Federal depository libraries nationwide. The libraries maintain these information products as part of their existing collections and are responsible for assuring that the public has free access to the information. Locate the Federal Depository Libraries http://www.access.gpo.gov/su_docs.

The U.S. Patent and Trademark Office (USPTO)

The U.S. Patent and Trademark Office provides online access to full text patents and patent applications. The database includes patents back to 1976 plus some pre-1975 patents. Visit the USPTO at http://www.uspto.gov/patft/.

Table of Contents

Subject Divisions/Categories

Document citations are grouped by division and then by category, according to the *NASA Scope and Coverage Category Guide.*

Aeronautics

01 Aeronautics (General) 1
02 Aerodynamics 2
03 Air Transportation and Safety 4
05 Aircraft Design, Testing and Performance 5
07 Aircraft Propulsion and Power 9
09 Research and Support Facilities (Air) 10

Astronautics

12 Astronautics (General) 10
14 Ground Support Systems and Facilities (Space) 11
15 Launch Vehicles and Launch Operations 12
16 Space Transportation and Safety 14
17 Space Communications, Spacecraft Communications, Command and Tracking 14
18 Spacecraft Design, Testing and Performance 14
19 Spacecraft Instrumentation and Astrionics 17
20 Spacecraft Propulsion and Power 17

Chemistry and Materials

23 Chemistry and Materials (General) 18
24 Composite Materials 22
25 Inorganic, Organic and Physical Chemistry 25
26 Metals and Metallic Materials 29
27 Nonmetallic Materials 35
28 Propellants and Fuels 39
29 Space Processing 39

Engineering

31 Engineering (General) 40
32 Communications and Radar 41
33 Electronics and Electrical Engineering 47
34 Fluid Mechanics and Thermodynamics 52
35 Instrumentation and Photography 58
36 Lasers and Masers 61
37 Mechanical Engineering 61
38 Quality Assurance and Reliability 64
39 Structural Mechanics 64

Geosciences

42 Geosciences (General) 65
43 Earth Resources and Remote Sensing 66
44 Energy Production and Conversion 68
45 Environment Pollution 69
46 Geophysics 73
47 Meteorology and Climatology 76
48 Oceanography 82

Life Sciences

51 Life Sciences (General) 83
52 Aerospace Medicine 140
54 Man/System Technology and Life Support 146

Mathematical and Computer Sciences

59 Mathematical and Computer Sciences (General) 147
60 Computer Operations and Hardware 155
61 Computer Programming and Software 156
62 Computer Systems 161
63 Cybernetics, Artificial Intelligence and Robotics 162
64 Numerical Analysis 163
65 Statistics and Probability 166
66 Systems Analysis and Operations Research 168
67 Theoretical Mathematics 169

Physics

70 Physics (General) 169
71 Acoustics 182
72 Atomic and Molecular Physics 183
73 Nuclear Physics 184
74 Optics 185
75 Plasma Physics 191
76 Solid-State Physics 197
77 Physics of Elementary Particles and Fields 199

Social and Information Sciences

81 Administration and Management 199
82 Documentation and Information Science 200
83 Economics and Cost Analysis 205

Space Sciences

88 Space Sciences (General) 206
89 Astronomy 206
90 Astrophysics 208
91 Lunar and Planetary Science and Exploration 216
92 Solar Physics 222

General

99 General 227

Indexes

Two indexes are available. You may use the find command under the tools menu while viewing the PDF file for direct match searching on any text string. You may also select either of the two indexes provided for linking to the corresponding document citation from *NASA Thesaurus* terms and personal author names.

Subject Term Index

Personal Author Index

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS

A Biweekly Publication of the National Aeronautics and Space Administration

VOLUME 42, APRIL 23, 2004

01
AERONAUTICS (GENERAL)

Includes general research topics related to manned and unmanned aircraft and the problems of flight within the Earth's atmosphere. Also includes manufacturing, maintenance, and repair of aircraft. For specific topics in aeronautics, see *categories 02 through 09*. For information related to space vehicles *see 12 Astronautics*.

20040047002 Swedish Defence Research Establishment, Stockholm
TurMMAC Afterbody Application Challenge
Tormalm, M.; Wallin, S.; Ashworth, R.; Hughes, R.; Davies, M.; Dec. 2002; In English
Report No.(s): PB2004-102198; FOI-R-0653-SE; No Copyright; Avail: National Technical Information Service (NTIS)

The purpose of the TurMMAC After-body Application Challenge is to validate current turbulence models and their ability to correctly predict the complex after-body base flow with a propulsive jet. The flow regime includes such phenomena as separation, shock boundary-layer interaction, jet-shear interaction, mixing and jet spreading. Nine turbulence models have been tested on five different cases of jet pressure ratio. Three partners, FOI, QinetiQ and BAE SYSTEMS, have each contributed with separate investigations using the available in-house code and turbulence models. The CFD results have been compared to experimental data from FOI. This report presents the result in the form of general flow field of Mach contours, surface and base pressure, separation point, boundary layer pressure and velocity, u- and v-velocity profiles, turbulent kinetic energy, Reynolds uy-stress and temperature profiles above and behind the after-body.
NTIS
Computational Fluid Dynamics; Velocity; Turbulence Models; Flow Distribution; Afterbodies

20040050170 National Renewable Energy Lab., Golden, CO, Colorado Univ., Boulder, CO
Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine
Wright, A. D.; Balas, M. J.; Nov. 2003; 18 pp.; In English
Report No.(s): DE2004-15005823; NREL/CP-500-35084; No Copyright; Avail: Department of Energy Information Bridge

Designing wind turbines to maximize energy production and increase fatigue life is a major goal of the wind industry. To achieve this goal, we must design wind turbines to extract maximum energy and reduce component and system loads. This paper applies modern state-space control design methods to a two-bladed teetering-hub upwind machine located at the National Wind Technology Center. The design objective is to regulate turbine speed in region 3 (above rated wind speed) and enhance damping in several lowdamped flexible modes of the turbine. The controls approach is based on the Disturbance Accommodating Control (DAC) method and provides accountability for wind-speed disturbances. First, controls are designed using the single control input rotor collective pitch to stabilize the first drive-train torsion as well as the tower first fore-aft bending modes. Generator torque is then incorporated as an additional control input. This reduces some of the demand placed on the rotor collective pitch control system and enhances first drive train torsion mode damping. Individual blade pitch control is then used to attenuate wind disturbances having spatial variation over the rotor and effectively reduces blade flap deflections caused by wind shear.
NTIS
Control Theory; Loads (Forces); Wind Turbines; Mathematical Models

02
AERODYNAMICS

Includes aerodynamics of flight vehicles, test bodies, airframe components and combinations, wings, and control surfaces. Also includes aerodynamics of rotors, stators, fans, and other elements of turbomachinery. For related information see also *34 Fluid Mechanics and Thermodynamics*.

20040045315 NASA Glenn Research Center, Cleveland, OH, USA
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig
Lewalle, Jacques; Ashpis, David E.; February 2004; 48 pp.; In English
Contract(s)/Grant(s): WU-22-522-31-23
Report No.(s): NASA/TM-2004-209452; NAS 1.15:209452; E-14350; No Copyright; Avail: CASI; A03, Hardcopy

Time scales in turbulent and transitional flow provide a link between experimental data and modeling, both in terms of physical content and for quantitative assessment. The problem of interest here is the definition of time scales in an unsteady flow. Using representative samples of data from GEAE low pressure turbine experiment in low speed research turbine facility with wake-induced transition, we document several methods to extract dominant frequencies, and compare the results. We show that conventional methods of time scale evaluation (based on autocorrelation functions and on Fourier spectra) and wavelet-based methods provide similar information when applied to stationary signals. We also show the greater flexibility of the wavelet-based methods when dealing with intermittent or strongly modulated data, as are encountered in transitioning boundary layers and in flows with unsteady forcing associated with wake passing. We define phase-averaged dominant frequencies that characterize the turbulence associated with freestream conditions and with the passing wakes downstream of a rotor. The relevance of these results for modeling is discussed in the paper.
Author
Wavelet Analysis; Turbulence; Turbomachinery; Unsteady Flow; Functions (Mathematics)

20040045342 NASA Glenn Research Center, Cleveland, OH, USA
High-Fidelity Three-Dimensional Simulation of the GE90
Turner, Mark G.; Norris, Andrew; Veres, Josphe P.; March 2004; 18 pp.; In English; 16th Computational Fluid Dynamics Conference, 23-26 Jun. 2003, Orlando, FL, USA
Contract(s)/Grant(s): WBS 22-708-87-01
Report No.(s): NASA/TM-2004-212981; AIAA Paper 2003-3996; NAS 1.15:212981; E-14456; No Copyright; Avail: CASI; A03, Hardcopy

A full-engine simulation of the three-dimensional flow in the GE90 94B high-bypass ratio turbofan engine has been achieved. It would take less than 11 hr of wall clock time if starting from scratch through the exploitation of parallel processing. The simulation of the compressor components, the cooled high-pressure turbine, and the low-pressure turbine was performed using the APNASA turbomachinery flow code. The combustor flow and chemistry were simulated using the National Combustor Code (NCC). The engine simulation matches the engine thermodynamic cycle for a sea-level takeoff condition. The simulation is started at the inlet of the fan and progresses downstream. Comparisons with the cycle point are presented. A detailed look at the blockage in the turbomachinery is presented as one measure to assess and view the solution and the multistage interaction effects.
Author
Computerized Simulation; Three Dimensional Flow; Turbofan Engines; Computational Fluid Dynamics; Combustion Chambers; Bypass Ratio

20040046916 George Washington Univ., Washington, DC, USA
Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia
Klein, Vladislav; [2002]; 6 pp.; In English
Contract(s)/Grant(s): NCC1-326; No Copyright; Avail: CASI; A02, Hardcopy

The program objectives were defined in the original proposal entitled 'Program of Research in Flight Dynamics in the JIAFS at NASA Langley Research Center' which was originated March 20, 1975, and yearly renewals of the research program dated December 1, 1998 to December 31, 2002. The program included three major topics: 1) Improvement of existing methods and development of new methods for flight and wind tunnel data analysis based on system identification methodology; 2) Application of these methods to flight and wind tunnel data obtained from advanced aircraft; 3) Modeling and control of aircraft. The principal investigator of the program was Dr. Vladislav Klein, Professor Emeritus at The George Washington

University, DC. Seven Graduate Research Scholar Assistants (GRSA) participated in the program. The results of the research conducted during four years of the total co-operative period were published in 2 NASA Technical Reports, 3 thesis and 3 papers. The list of these publications is included.
Author
Aerodynamics; Wind Tunnel Tests; Data Processing; System Identification

20040046920 NASA Langley Research Center, Hampton, VA, USA
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds
Erickson, Gary E.; February 2004; 45 pp.; In English
Contract(s)/Grant(s): 721-10-66
Report No.(s): NASA/TM-2004-212991; L-18327; No Copyright; Avail: CASI; A03, Hardcopy

A pressure-sensitive paint (PSP) technique was applied in a wind tunnel experiment in the NASA Langley Research Center 8-Foot Transonic Pressure Tunnel to quantify the vortex-induced surface static pressures on a slender, faceted missile model at subsonic and transonic speeds. Global PSP calibrations were obtained using an in-situ method featuring the simultaneous electronically-scanned pressures (ESP) measurements. Both techniques revealed the significant influence leading-edge vortices on the surface pressure distributions. The mean error in the PSP measurements relative to the ESP data was approximately 0.6 percent at M(sub infinity)=0.70 and 2.6 percent at M(sub infinity)=0.90 and 1.20. The vortex surface pressure signatures obtained from the PSP and ESP techniques were correlated with the off-surface vortex cross-flow structures obtained using a laser vapor screen (LVS) flow visualization technique. The on-surface and off-surface techniques were complementary, since each provided details of the vortex-dominated flow that were not clear or apparent in the other.
Author
Flow Visualization; Pressure Sensitive Paints; Subsonic Speed; Transonic Speed; Missile Configurations; Calibrating

20040047191 NASA Langley Research Center, Hampton, VA, USA
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds
Erickson, Gary E.; February 2004; 45 pp.; In English
Contract(s)/Grant(s): WU 23-721-10-66
Report No.(s): NASA/TM-2004-212991; L-18327; No Copyright; Avail: CASI; A03, Hardcopy

A pressure-sensitive paint (PSP) technique was applied in a wind tunnel experiment in the NASA Langley Research Center 8-Foot Transonic Pressure Tunnel to quantify the vortex-induced surface static pressures on a slender, faceted missile model at subsonic and transonic speeds. Satisfactory global calibrations of the PSP were obtained at =0.70, 0.90, and 1.20, angles of attack from 10 degrees to 20 degrees, and angles of sideslip of 0 and 2.5 degrees using an in-situ method featuring the simultaneous acquisition of electronically-scanned pressures (ESP) at 57 discrete locations on the model. Both techniques clearly revealed the significant influence on the surface pressure distributions of the vortices shed from the sharp, chine-like leading edges. The mean error in the PSP measurements relative to the ESP data was approximately 0.6 percent at M infinity =0.70 and 2.6 percent at M infinity =0.90 and 1.20. The vortex surface pressure signatures obtained from the PSP and ESP techniques were correlated with the off-surface vortex cross-flow structures obtained using a laser vapor screen (LVS) flow visualization technique. The on-surface and off-surface techniques were complementary, since each provided details of the vortex-dominated flow that were not clear or apparent in the other.
Author
Pressure Sensitive Paints; Subsonic Speed; Transonic Speed; Transonic Wind Tunnels; Missile Configurations; Wind Tunnel Tests

20040050737 Air Force Flight Test Center, Edwards AFB, CA
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP)
Witte, Joel; Monson, Svend; Washington, Thomas; Cowart, Kris; Salasovich, Rich; Dec. 2003; 135 pp.; In English
Report No.(s): AD-A421043; AFFTC-TIM-03-08; No Copyright; Avail: CASI; A07, Hardcopy

This report presents the results of Project MAX QAP, a method of predicting pilot induced oscillations (PIO) caused by actuator rate limiting. The overall test objective was to correlate, if possible, Pilot-induced Oscillation Tendency Ratings with a new preflight calculation called the Gap Criterion. The Air Force Institute of Technology, Engineering Department

(AFIT/ENY) requested this testing. The USAF Test Pilot School (TPS), Class 03A, conducted 8 flight test totaling 10.8 hours at Edwards AFB, California, from 16 to 22 October 2003.
DTIC
Actuators; Flight Tests; Pilot Induced Oscillation; Ratings

20040050739 Case Western Reserve Univ., Cleveland, OH
Instrumentation for Wind Tunnel Transient Growth Studies
White, Edward B.; Mar. 10, 2004; 13 pp.; In English
Contract(s)/Grant(s): F49620-02-1-0287; Proj-3484
Report No.(s): AD-A421045; AFRL-SR-AR-TR-04-0169; No Copyright; Avail: CASI; A03, Hardcopy

Wind tunnel studies on the laminar-to-turbulent transition mechanism known as transient growth require instrumentation suitable for the production of high but controllable levels of freestream turbulence, model surfaces relevant to transition problems of engineering interest, and hotwire instrumentation suitable for measuring disturbances that lead to transition. Ongoing and planned experiments on transient growth at the Case Western Reserve University Wind Tunnel Laboratory required instrumentation in each of these categories to enable investigations in high-disturbance environments such as those found on the blades of low-pressure turbines. The DURIP grant for which this is the final technical report provided for instrumentation purchases in each of the key areas. Specifically, the grant provided for a significant improvement in the Laboratory's hotwire anemometry capability through the addition of four additional hotwire channels and numerous hotwire probes, the fabrication of a variable-angle cascade test section and PakB blade row, and the fabrication of an active turbulence generator.
DTIC
Hot-Wire Anemometers; Wind Tunnels

03
AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; airport ground operations; flight safety and hazards; and aircraft accidents. Systems and hardware specific to ground operations of aircraft and to airport construction are covered in *09 Research and Support Facilities (Air)*. Air traffic control is covered in *04 Aircraft Communications and Navigation*. For related information see also *16 Space Transportation and Safety* and *85 Technology Utilization and Surface Transportation*.

20040047035 General Accounting Office, Washington, DC
Aviation Security: Computer-Assisted Passenger Prescreening System Faces Significant Implementation Challenges
Feb. 2004; 58 pp.; In English
Report No.(s): PB2004-103097; GAO-04-385; No Copyright; Avail: CASI; A04, Hardcopy

The security of U.S. commercial aviation is a long-standing concern, and substantial efforts have been undertaken to strengthen it. One of these efforts is the development of a new Computer-Assisted Passenger Prescreening System (CAPPS II) to identify passengers requiring additional security attention. The development of CAPPS II has raised a number of issues, including whether individuals may be inappropriately targeted for additional screening, and whether data accessed by the system may compromise passengers' privacy. GAO was asked to determine (1) the development status and plans for CAPPS II; (2) the status of CAPPS II in addressing key developmental, operational, and public acceptance issues; and (3) other challenges that could impede the successful implementation of the system.
NTIS
Air Transportation; Airline Operations; Commercial Aircraft

20040047190 RTI International, Hampton, VA, USA
The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display
Burgess, Malcolm A.; Thomas, Rickey P.; March 2004; 240 pp.; In English; Original contains color illustrations
Report No.(s): NASA/CR-2004-212655; NAS 1.26:212655; No Copyright; Avail: CASI; A11, Hardcopy

This experiment investigated improvements to cockpit weather displays to better support the hazardous weather avoidance decision-making of general aviation pilots. Forty-eight general aviation pilots were divided into three equal groups and presented with a simulated flight scenario involving embedded convective activity. The control group had access to conventional sources of pre-flight and in-flight weather products. The two treatment groups were provided with a weather

display that presented NEXRAD mosaic images, graphic depiction of METARs, and text METARs. One treatment group used a NEXRAD image looping feature and the second group used the National Convective Weather Forecast (NCWF) product overlaid on the NEXRAD display. Both of the treatment displays provided a significant increase in situation awareness but, they provided incomplete information required to deal with hazardous convective weather conditions, and would require substantial pilot training to permit their safe and effective use.
Author
Cockpits; Decision Making; General Aviation Aircraft; Pilot Training; Weather Forecasting

20040050329 Louisiana Dept. of Transportation and Development, Baton Rouge, LA, USA
Development of an Aircraft Operation Classification System for Louisiana's Airports
Harlow, C.; Jun. 2003; 74 pp.; In English
Report No.(s): PB2004-104336; No Copyright; Avail: CASI; A04, Hardcopy

In this project the development and deployment of systems measuring aircraft activity at airports is considered. This includes determining the type of aircraft and the type of aircraft activity. The type of aircraft is basic such as helicopter, single engine, multiengine, and jet aircraft. The different aircraft activities at airports include take-offs, landings, touch and go and low approach. Accurate counts of aircraft operations are important because the number and types of aircraft operations are related to airport planning and operation. The objective of this project was to investigate the feasibility of developing an automatic aircraft operation monitoring system. This involved investigating candidate technologies and developing a prototype system for monitoring aircraft operations. In large airports with control tower operations, one can readily determine aircraft operations because the towers are always manned and logs are kept of all operations. This is not true at smaller and rural airports that may be only manned during certain hours. Some of the issues involved in deploying technologies for monitoring aircraft operations include: the system must be cost-effective, reliable portable, must operate self-contained in the field for two weeks, and must be acceptable at airports.
NTIS
Airports; Aircraft; Classifications

05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes all stages of design of aircraft and aircraft structures and systems. Also includes aircraft testing, performance, and evaluation, and aircraft and flight simulation technology. For related information see also *18 Spacecraft Design, Testing and Performance*; and *39 Structural Mechanics*. For land transportation vehicles see *85 Technology Utilization and Surface Transportation*.

20040045297 Johns Hopkins Univ., Baltimore, MD, USA
Nondestructive Evaluation of Aircraft and Spacecraft Wiring
White, John E.; Tucholski, Edward J.; Green, Robert E., Jr.; [2004]; 21 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

Spacecraft, and especially aircraft, often fry well past their original design lives and, therefore, the need to develop nondestructive evaluation procedures for inspection of vital structures in these craft is extremely important. One of the more recent problems is the degradation of wiring and wiring insulation. The present paper describes several nondestructive characterization methods which afford the possibility to detect wiring and insulation degradation in-situ prior to major problems with the safety of aircraft and spacecraft.
Author
Degradation; Inspection; Nondestructive Tests; Wiring

20040046150 Hampton Univ., VA, USA
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis
Morgan, Morris H., III; Gilinsky, Mikhail M.; March 2004; 13 pp.; In English
Contract(s)/Grant(s): NAG1-2249; No Copyright; Avail: CASI; A03, Hardcopy

In this project on the first stage (2000-Ol), we continued to develop the previous joint research between the Fluid Mechanics and Acoustics Laboratory (FM&AL) at Hampton University (HU) and the Jet Noise Team (JNT) at the NASA Langley Research Center (NASA LaRC). At the second stage (2001-03), FM&AL team concentrated its efforts on solving of problems of interest to Glenn Research Center (NASA GRC), especially in the field of propulsion system enhancement. The NASA GRC R&D Directorate and LaRC Hyper-X Program specialists in a hypersonic technology jointly with the FM&AL

staff conducted research on a wide region of problems in the propulsion field as well as in experimental testing and theoretical and numerical simulation analyses for advanced aircraft and rocket engines. The last year the Hampton University School of Engineering & Technology was awarded the NASA grant, for creation of the Aeropropulsion Center, and the FM&AL is a key team of the project fulfillment responsible for research in Aeropropulsion and Acoustics (Pillar I). This work is supported by joint research between the NASA GRC/ FM&AL and the Institute of Mechanics at Moscow State University (IMMSU) in Russia under a CRDF grant. The main areas of current scientific interest of the FM&AL include an investigation of the proposed and patented advanced methods for aircraft engine thrust and noise benefits. This is the main subject of our other projects, of which one is presented. The last year we concentrated our efforts to analyze three main problems: (a) new effective methods fuel injection into the flow stream in air-breathing engines; (b) new re-circulation method for mixing, heat transfer and combustion enhancement in propulsion systems and domestic industry application; (c) covexity flow The research is focused on a wide regime of problems in the propulsion field as well as in experimental testing and theoretical and numerical simulation analyses for advanced aircraft and rocket engines (see, for example, Figures 4). The FM&AL Team uses analytical methods, numerical simulations and experimental tests at the Hampton University campus, NASA and IM/MSU.
Derived from text

Aircraft Engines; Thrust; Noise (Sound); Propulsion System Performance; Numerical Analysis; Performance Tests; Fuel Injection; Augmentation

20040046151 NASA Glenn Research Center, Cleveland, OH, USA

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement

Gilinsky, M.; Blankson, I. M.; [2000]; 12 pp.; In English; 36th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, 17-19 Jul. 2000, Huntsville, AL, USA

Contract(s)/Grant(s): NAG1-2249; NAG1-1835; NAG1-1936; NAG3-2249

Report No.(s): AIAA Paper 2000-3315; No Copyright; Avail: CASI; A03, Hardcopy

The following research results are based on development of an approach previously proposed by the authors for optimum nozzle design to obtain maximum thrust. The design was denoted a Telescope nozzle. A Telescope nozzle contains one or several internal designs of certain location, which are inserted at certain locations into a divergent conical or planar main nozzle near its exit. Such a design provides additional thrust augmentation over 20% by comparison with the optimum single nozzle of equivalent lateral area. What is more, recent experimental acoustic tests have discovered an essential noise reduction due to Telescope nozzles application. In this paper, some additional theoretical results are presented for Telescope nozzles and a similar approach is applied for aeroperformance improvement of a supersonic inlet. In addition, a classic gas dynamics problem of a similar supersonic flow into a plate has been analyzed. In some particular cases, new exact analytical solutions are obtained for a flow into a wedge with an oblique shock wave. Numerical simulations were conducted for supersonic flow into a divergent portion of a 2D or axisymmetric nozzle with several plane or conical designs as well as into a 2D or axisymmetric supersonic inlet with a forebody. The 1st order Kryko-Godunov marching numerical scheme for inviscid supersonic flows was used. Several cases were tested using the NASA CFL3d code based on full Navier-Stokes equations. Numerical simulation results have confirmed essential benefits of Telescope design applications in propulsion systems.
Author

Design Analysis; Inlet Nozzles; Propulsion System Performance; Thrust Augmentation; Nozzle Design

20040046890 NASA Glenn Research Center, Cleveland, OH, USA

Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits

Gilinsky, M.; Blankson, I. M.; Gromov, V. G.; Sakharov, V. I.; [2004]; 12 pp.; In English; AIAA/NAL-NASDA-ISAS 10th International Space Planes and Hypersonic Systems and Technologies Conference, 24-27 Apr. 2001, Kyoto, Japan

Contract(s)/Grant(s): NAG1-2249; NAG3-2249; NAG3-2495

Report No.(s): AIAA Paper 2001-1893; Copyright; Avail: CASI; A03, Hardcopy

The following research results are based on development of an approach previously proposed and investigated in for optimum nozzle design to obtain maximum thrust. The design was denoted a Telescope nozzle. A Telescope nozzle contains one or several internal designs, which are inserted at certain locations into a divergent conical or planar main nozzle near its exit. Such a design provides additional thrust augmentation over 20% by comparison with the optimum single nozzle of equivalent lateral area, What is more, experimental acoustic tests have discovered an essential noise reduction due to application of Telescope nozzles. In this paper, some additional theoretical results are presented for Telescope nozzles and a similar approach is applied for aero-performance improvement of a supersonic inlet. Numerical simulations were conducted for supersonic flow into the divergent portion of a 2D or axisymmetric nozzle with several plane or conical designs as well as into a 2D or axisymmetric supersonic inlet with a forebody. The Kryko-Godunov marching numerical scheme for inviscid

supersonic flows was used. Several cases were tested using the NASA CFL3d and IM/MSU Russian codes based on the full Navier-Stokes equations. Numerical simulations were conducted for non reacting flows (both codes) as well as for real high temperature gas flows with non-equilibrium chemical reactions (the latter code). In general, these simulations have confirmed essential benefits of Telescope design applications in propulsion system. Some preliminary numerical simulations of several typical inlet designs were conducted with the goal of inlet design optimization for maneuvering flight conditions.
Author
Conical Nozzles; Design Optimization; Gas Flow; Noise Reduction; Nozzle Design; Reacting Flow; Supersonic Flow; Supersonic Inlets

20040047195 NASA Langley Research Center, Hampton, VA, USA
Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service
Edahl, Robert A., Jr.; Domack, Marcia; February 2004; 105 pp.; In English; Original contains black and white illustrations
Contract(s)/Grant(s): WU 703-63-61-01; 23-762-55-LD
Report No.(s): NASA/TP-2004-212988; L-19017; No Copyright; Avail: CASI; A06, Hardcopy

Tensile properties were evaluated for four aluminum alloys that are candidates for airframe applications on high speed transport aircraft. These alloys included the Al-Cu-Mg-Ag alloys C415 and C416 and the Al-Cu-Li-Mg-Ag alloys RX818 and ML377. The Al-Cu-Mg alloys CM001, which was used on the Concorde SST, and 1143, which was modified from the alloy used on the TU144 Russian supersonic aircraft, were tested for comparison. The alloys were subjected to thermal exposure at 200 F, 225 F and 275 F for times up to 30,000 hours. Tensile tests were performed on thermally-exposed and as-received material at -65 F, room temperature, 200 F, 225 F and 275 F. All four candidate alloys showed significant tensile property improvements over CM001 and 1143. Room temperature yield strengths of the candidate alloys were at least 20% greater than for CM001 and 1143, for both the as-received and thermally-exposed conditions. The strength levels of alloy RX818 were the highest of all materials investigated, and were 5-10% higher than for ML377, C415 and C416 for the as-received condition and after 5,000 hours thermal exposure. RX818 was removed from this study after 5,000 hours exposure due to poor fracture toughness performance observed in a parallel study. After 30,000 hours exposure at 200 F and 225 F, the alloys C415, C416 and ML377 showed minor decreases in yield strength, tensile strength and elongation when compared to the as-received properties. Reductions in tensile strength from the as-received values were up to 25% for alloys C415, C416 and ML377 after 15,000 hours exposure at 275 F.
Author
High Temperature; Exposure; Tensile Properties; Aluminum Alloys; Tensile Tests

20040047259 NASA Marshall Space Flight Center, Huntsville, AL, USA
Wing Leading Edge Debris Analysis
Shah, Sandeep; Jerman, Gregory; March 02, 2004; 24 pp.; In English; TMS 2004, Annual Meeting, Special Topic, 14-18 Mar. 2004, Charlotte, NC, USA; No Copyright; Avail: CASI; A03, Hardcopy

This is a slide presentation showing the Left Wing Leading Edge (WLE) heat damage observations: Heavy 'slag' deposits on select RCC panels. Eroded and knife-edged RCC rib sections. Excessive overheating and slumping of carrier panel tiles. Missing or molten attachment bolts but intact bushing. Deposit mainly on 'inside' RCC panel. Deposit on some fractured RCC surface
Derived from text
Damage Assessment; Deposits; Leading Edges; Wings; Debris; Columbia (Orbiter)

20040050297 California Polytechnic State Univ., San Luis Obispo, CA, USA
Design, Development and Testing of Airplanes for Mars Exploration
Hall, David W.; [2004]; 14 pp.; In English
Contract(s)/Grant(s): NCC2-5464; No Copyright; Avail: CASI; A03, Hardcopy

The opportunity for a piggyback mission to Mars aboard an Ariane 5 rocket in the early spring of 1999 set off feverish design activity at several NASA centers. This report describes the contract work done by faculty, students, and consultants at the California Polytechnic State University in San Luis Obispo California (Cal poly/SLO) to support the NASA/Ames design, construction and test efforts to develop a simple and robust Mars Flyer configuration capable of performing a practical science mission on Mars. The first sections will address the conceptual design of a workable Mars Flyer configuration which started in the spring and summer of 1999. The following sections will focus on construction and flight test of two full-scale vehicles.

The final section will reflect on the overall effort and make recommendations for future work.
Derived from text
Mars Exploration; NASA Space Programs; Aerodynamic Configurations; Full Scale Tests; Flight Test Vehicles

20040050606 Old Dominion Univ., Norfolk, VA, USA
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method
Golub, Robert A., Technical Monitor; Dunn, Mark; [2004]; 28 pp.; In English
Contract(s)/Grant(s): NAG1-01068
Report No.(s): ODURF-112051; No Copyright; Avail: CASI; A03, Hardcopy

In this research project, a computational method for predicting the acoustic field produced by the scattering of engine-generated noise by advanced subsonic aircraft configurations was developed using the equivalent source method (ESM). Previous research on this subject conducted by the author focused on determining the feasibility of applying the ESM for noise prediction studies in the absence of flow and for simple noise generation mechanisms. In these proof of concept studies, details of ESM implementation were developed, computed results compared to NASA Langley acoustic experiments, and limitations identified. For this project several theoretical and computational enhancements to the above ESM methodology were developed. First, the ability to predict the scattered acoustic pressure field for an airframe/engine configuration at take-off conditions was developed by manipulating the governing differential equations for the passage of a sound wave through a uniform flow field. Details of this theoretical analysis are provided in attachment 1. The second thrust of this research was to build a design analysis tool for studying advanced noise reduction strategies. In fulfillment of this goal, mathematical algorithms were developed for including acoustic liners on the scattering surfaces, the ability to treat a wider range of operating conditions, and linkage with other NASA Langley generated noise analysis programs such as AVATAR/ANOPP and TBIEM3D. The final phase of this research involved the development of algorithms for including the effects of realistic airframe geometry. ESM grid generation strategies were developed for including actual airplane wing, fuselage, nacelle, and tail section geometries.
Author
Acoustic Scattering; Algorithms; Body-Wing and Tail Configurations; Design Analysis; Engine Noise; Flow Noise; Noise Prediction (Aircraft); Numerical Analysis

20040050626 Army Research Lab., Cleveland, OH, USA, NASA Glenn Research Center, Cleveland, OH, USA
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery
Jansen, Mark; Montague, Gerald; Provenza, Andrew; Palazzolo, Alan; March 2004; 13 pp.; In English; Turbo Expo 2004, 14-17 Jun. 2004, Vienna, Austria
Contract(s)/Grant(s): WBS-22-714-70-10; 1L162211A47A
Report No.(s): NASA/TM-2004-212952; ARL-TR-3156; GT2004-53321; NAS 1.15-212952; E-14391; No Copyright; Avail: CASI; A03, Hardcopy

Closed loop operation of a single, high temperature magnetic radial bearing to 30,000 RPM (2.25 million DN) and 540 C (1000 F) is discussed. Also, high temperature, fault tolerant operation for the three axis system is examined. A novel, hydrostatic backup bearing system was employed to attain high speed, high temperature, lubrication free support of the entire rotor system. The hydrostatic bearings were made of a high lubricity material and acted as journal-type backup bearings. New, high temperature displacement sensors were successfully employed to monitor shaft position throughout the entire temperature range and are described in this paper. Control of the system was accomplished through a stand alone, high speed computer controller and it was used to run both the fault-tolerant PID and active vibration control algorithms.
Author
High Speed; High Temperature; Fault Tolerance; Magnetic Bearings; Rotors; Turbomachinery; Support Systems

20040050656 Kentucky Univ., Lexington, KY
Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions
Tzou, H. S.; Blandford, G. E.; Jan. 2004; 376 pp.; In English
Contract(s)/Grant(s): F49620-98-1-0467; Proj-3484
Report No.(s): AD-A420905; AFRL-SR-AR-TR-04-0154; No Copyright; Avail: CASI; A17, Hardcopy

Imposed shape changes and surface control of flexible structures can offer many aerodynamic advantages in flight maneuverability and precision control. Largely deformed shapes and surfaces often involve nonlinear deformations. Studies

on the control of nonlinear behavior related to the deformed surfaces and shape changes would provide detailed information for future controlled surface design and implementation. This research is concerned with the controlling nonlinearly deformed structures, e.g., various shells and flexible wings, based on the smart structures technology. Distributed sensing/actuation, thermoelectromechanical/control equations and boundary conditions including elastic, temperature, and piezoelectric couplings are derived and applied to distributed sensing/actuation and control of various nonlinear and linear aerospace structures and components made of shells and plates. Analytical solutions are compared with experimental data and for finite element solutions. A new finite element code, consisting of nonlinear/linear piezothermoelastic shell and hexahedral elements, is developed and applied to various nonlinear/ linear aerospace structures with or without temperature excitations. Active control of imposed shape changes, nonlinear flexible deflections, thermal deformations, natural frequencies, and dynamic responses using distributed piezoelectric actuators are studied, and their nonlinear effects evaluated.
DTIC
Active Control; Aerodynamics; Aircraft Control; Aircraft Equipment; Aircraft Structures; Distributed Parameter Systems; Nonlinear Systems; Nonlinearity

07
AIRCRAFT PROPULSION AND POWER

Includes primary propulsion systems and related systems and components, e.g., gas turbine engines, compressors, and fuel systems; and onboard auxiliary power plants for aircraft. For related information see also *20 Spacecraft Propulsion and Power; 28 Propellants and Fuels*; and *44 Energy Production and Conversion*.

20040047276 NASA Glenn Research Center, Cleveland, OH, USA
Experimental Investigation of Centrifugal Compressor Stabilization Techniques
Skoch, Gary J.; December 2003; 18 pp.; In English; Turbo Expo 2003, 16-19 Jun. 2003, Atlanta, GA, USA; Original contains color and black and white illustrations
Contract(s)/Grant(s): DA Proj. 1L1-61102-AF-20; WBS 708-28-03
Report No.(s): NASA/TM-2003-212599; E-14156; ARL-TR-2921; GT-2003-38524; No Copyright; Avail: CASI; A03, Hardcopy

Results from a series of experiments to investigate techniques for extending the stable flow range of a centrifugal compressor are reported. The research was conducted in a high-speed centrifugal compressor at the NASA Glenn Research Center. The stabilizing effect of steadily flowing air-streams injected into the vaneless region of a vane-island diffuser through the shroud surface is described. Parametric variations of injection angle, injection flow rate, number of injectors, injector spacing, and injection versus bleed were investigated for a range of impeller speeds and tip clearances. Both the compressor discharge and an external source were used for the injection air supply. The stabilizing effect of flow obstructions created by tubes that were inserted into the diffuser vaneless space through the shroud was also investigated. Tube immersion into the vaneless space was varied in the flow obstruction experiments. Results from testing done at impeller design speed and tip clearance are presented. Surge margin improved by 1.7 points using injection air that was supplied from within the compressor. Externally supplied injection air was used to return the compressor to stable operation after being throttled into surge. The tubes, which were capped to prevent mass flux, provided 9.3 points of additional surge margin over the baseline surge margin of 11.7 points.
Author
Centrifugal Compressors; Compressors; Stability; Surges; Air Flow

20040050631 Modern Technologies Corp., Middleburg Heights, OH, USA
Jet Noise Modeling for Supersonic Business Jet Application
Stone, James R.; Krejsa, Eugene A.; Clark, Bruce J.; March 2004; 105 pp.; In English
Contract(s)/Grant(s): NAS3-00178; WBS-22-781-30-12
Report No.(s): NASA/CR-2004-212984; NAS 1.26:212984; E-14458; No Copyright; Avail: CASI; A06, Hardcopy

This document describes the development of an improved predictive model for coannular jet noise, including noise suppression modifications applicable to small supersonic-cruise aircraft such as the Supersonic Business Jet (SBJ), for NASA Langley Research Center (LaRC). For such aircraft a wide range of propulsion and integration options are under consideration. Thus there is a need for very versatile design tools, including a noise prediction model. The approach used is similar to that used with great success by the Modern Technologies Corporation (MTC) in developing a noise prediction model for two-dimensional mixer ejector (2DME) nozzles under the High Speed Research Program and in developing a more recent

model for coannular nozzles over a wide range of conditions. If highly suppressed configurations are ultimately required, the 2DME model is expected to provide reasonable prediction for these smaller scales, although this has not been demonstrated. It is considered likely that more modest suppression approaches, such as dual stream nozzles featuring chevron or chute suppressors, perhaps in conjunction with inverted velocity profiles (IVP), will be sufficient for the SBJ.
Author
Supersonic Jet Flow; Supersonic Aircraft; Noise Reduction; Noise Prediction; Jet Aircraft Noise; High Speed; Models

09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, runways, hangars, and aircraft repair and overhaul facilities; wind tunnels, water tunnels, and shock tubes; flight simulators; and aircraft engine test stands. Also includes airport ground equipment and systems. For airport ground operations see *03 Air Transportation and Safety*. For astronautical facilities see *14 Ground Support Systems and Facilities (Space)*.

20040045260 NASA Ames Research Center, Moffett Field, CA, USA
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining
Soderman, Paul T.; Jaeger, Stephen M.; Hayes, Julie A.; Allen, Christopher S.; November 2002; 132 pp.; In English
Contract(s)/Grant(s): 519-20-32
Report No.(s): NASA/TP-2002-211581; A-0208162; No Copyright; Avail: CASI; A07, Hardcopy

A recessed, 42-inch deep acoustic lining has been designed and installed in the 40- by 80- Foot Wind Tunnel (40x80) test section to greatly improve the acoustic quality of the facility. This report describes the test section acoustic performance as determined by a detailed static calibration-all data were acquired without wind. Global measurements of sound decay from steady noise sources showed that the facility is suitable for acoustic studies of jet noise or similar randomly generated sound. The wall sound absorption, size of the facility, and averaging effects of wide band random noise all tend to minimize interference effects from wall reflections. The decay of white noise with distance was close to free field above 250 Hz. However, tonal sound data from propellers and fans, for example, will have an error band to be described that is caused by the sensitivity of tones to even weak interference. That error band could be minimized by use of directional instruments such as phased microphone arrays. Above 10 kHz, air absorption began to dominate the sound field in the large test section, reflections became weaker, and the test section tended toward an anechoic environment as frequency increased.
Author
Acoustic Attenuation; Wind Tunnel Tests; Aeroacoustics; Linings; Installing

12
ASTRONAUTICS (GENERAL)

Includes general research topics related to space flight and manned and unmanned space vehicles, platforms or objects launched into, or assembled in, outer space; and related components and equipment. Also includes manufacturing and maintenance of such vehicles or platforms. For specific topics in astronautics see *categories 13 through 20*. For extraterrestrial exploration see *91 Lunar and Planetary Science and Exploration*.

20040045216 NASA Langley Research Center, Hampton, VA, USA
Overviews of the Apollo Program and Its Management
January 2004; 14 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

This special bibliography includes items individually selected by scientific and technical information professionals that provide an overview of the history, events, and results of the Apollo missions. Planning, scheduling, and management are also included.
Author
Apollo Spacecraft; Bibliographies; Project Management; Schedules; NASA Space Programs

20040050765 Texas Univ., Dallas, TX
Sensor Development for In-Situ Thermospheric Neutral Wind Measurements
Heelis, R. A.; Aug. 8, 2001; 15 pp.; In English
Contract(s)/Grant(s): F19628-00-C-0028; Proj-2310
Report No.(s): AD-A421082; AFRL-VS-TR-2003-1579; No Copyright; Avail: CASI; A03, Hardcopy

This report describes progress made in the development of novel new sensors to measure the thermospheric neutral wind

velocity from space. The measurements depend upon the supersonic velocity of the spacecraft to determine a velocity vector from measurement of the kinetic energy of the gas along the sensor look direction and the angle of arrival of the gas with respect to that look direction. Two sensors are utilized; one to measure the kinetic energy of the gas and another to measure the arrival angle. The arrival angle is determined from the differential pressure in two adjacent chambers with small entrance apertures. Different pressures in each chamber result from different angles of attack with respect to the chamber apertures. The kinetic energy of the gas with respect to the sensor normal is measured by examining the ions resulting from ionization of the neutrals that flow, undisturbed through an ion source. These two sensors are described in detail with emphasis on the functional verification required to establish the techniques for space flight. In addition to the verification of approach and the detailed design implementation, the requirements for specific accommodation on the Air Force C/NOFS satellite have also been considered.
DTIC
In Situ Measurement; Measuring Instruments; Neutral Atmospheres; Thermosphere; Wind Velocity; Winds Aloft

14
GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and test chambers and simulators. Also includes extraterrestrial bases and supporting equipment. For related information see also *09 Research and Support Facilities (Air)*.

20040045214 NASA Langley Research Center, Hampton, VA, USA
Lunar and Planetary Bases, Habitats, and Colonies
January 2004; 155 pp.; In English; No Copyright; Avail: CASI; A08, Hardcopy
This special bibliography includes the design and construction of lunar and Mars bases, habitats, and settlements; construction materials and equipment; life support systems; base operations and logistics; thermal management and power systems; and robotic systems.
Author
Lunar Bases; Mars Bases; Bibliographies; Robotics; Power Supplies; Space Habitats; Space Colonies

20040045218 NASA Langley Research Center, Hampton, VA, USA
Roving Vehicles for Lunar and Planetary Exploration
January 2004; 151 pp.; In English; No Copyright; Avail: CASI; A08, Hardcopy
This special bibliography includes the design, development, and application of lunar and Mars rovers; vehicle instrumentation and power supplies; navigation and control technologies; and site selection.
Author
Bibliographies; Lunar Exploration; Navigation; Mars Roving Vehicles; Lunar Roving Vehicles; Mars Landing Sites; Mars Exploration

20040050638 NASA Stennis Space Center, Bay Saint Louis, MS, USA
An Architecture for Intelligent Systems Based on Smart Sensors
Schmalzel, John; Figueroa, Fernando; Morris, Jon; Mandayam, Shreekanth; Polikar, Robi; May 18, 2004; 5 pp.; In English; 2004 IEEE Instrumentation and Measurement Technology Conference, 18-20 May 2004, Como, Italy
Report No.(s): SE-2003-12-00108-SSC; No Copyright; Avail: CASI; A01, Hardcopy
Based on requirements for a next-generation rocket test facility, elements of a prototype Intelligent Rocket Test Facility (IRTF) have been implemented. A key component is distributed smart sensor elements integrated using a knowledgeware environment. One of the specific goals is to imbue sensors with the intelligence needed to perform self diagnosis of health and to participate in a hierarchy of health determination at sensor, process, and system levels. The preliminary results provide the basis for future advanced development and validation using rocket test stand facilities at Stennis Space Center (SSC). We have identified issues important to further development of health-enabled networks, which should be of interest to others working with smart sensors and intelligent health management systems.
Author
Expert Systems; Systems Health Monitoring

15
LAUNCH VEHICLES AND LAUNCH OPERATIONS

Includes all classes of launch vehicles, launch/space vehicle systems, and boosters; and launch operations. For related information see also *18 Spacecraft Design, Testing and Performance*; and *20 Spacecraft Propulsion and Power*.

20040045215 NASA Langley Research Center, Hampton, VA, USA
Next Generation Spacecraft, Crew Exploration Vehicle
January 2004; 252 pp.; In English; No Copyright; Avail: CASI; A12, Hardcopy

This special bibliography includes research on reusable launch vehicles, aerospace planes, shuttle replacement, crew/cargo transfer vehicle, related X-craft, orbital space plane, and next generation launch technology.
Author
Aerospace Planes; Bibliographies; Reusable Launch Vehicles; Spacecrews; Technology Utilization; Hypersonic Vehicles; Space Shuttles; Launch Vehicle Configurations

20040050664 Boeing Co., Kihei, HI
SIM: The Satellite and Missile Mission Simulator
Cid, Florencio; Houchard, Jeff; Puccetti, Matt; Cabanilla, Juan; Orth, Robin; Jan. 2002; 12 pp.; In English
Contract(s)/Grant(s): F29601-00-D-0204; Proj-4868; Proj-4983
Report No.(s): AD-A420924; XC-AFRL/DET-15; No Copyright; Avail: CASI; A03, Hardcopy

The Simulator (SIM) system is a powerful tool that can be used to develop, recreate, and test satellite and missile missions. SIM provides a geometrically correct focal- plane scene of the simulated sky for multiple mount and sensor types. It is operational in two modes: Pure and Hybrid. The pure-mode SIM simulates everything, including time and pointing angles. The hybrid-mode SIM interfaces with actual telescope tracking and mount control software to obtain pointing angles and uses an IRIG-B signal for the time. Based on an event-driven architecture, the SIM system provides an easy way to 'script' simple to complex target sequences as viewed from a selected site, mount, and sensor combination. These scripted target sequences can be executed for viewing and edited, as necessary, using pure-mode SIM. They may also be used to support actual target acquisition and data collection missions in the hybrid-mode. (6 figures)
DTIC
Artificial Satellites; Computerized Simulation; Missile Tracking; Satellite Tracking

20040050665 Air Force Research Lab., Detachment 15, Kihei Maui, HI
Atmospheric Density Dynamics and the Motion of Satellites
Sabol, Chris; Luu, K. K.; Jan. 2002; 11 pp.; In English
Contract(s)/Grant(s): F29601-00-D-0204; Proj-4868; Proj-4983
Report No.(s): AD-A420925; XC-AFRL/DET-15; No Copyright; Avail: CASI; A03, Hardcopy

Atmospheric density modeling has long been one of the greatest uncertainties in the dynamics of low Earth satellite orbits. Accurate density calculations are required to provide meaningful estimates of the atmospheric drag perturbing satellite motion. These effects increase with lower altitude orbits and also with higher effective area and lower mass satellites. Both of these conditions are usually met by the new class of small satellites being developed around the world as low-cost ventures into space. Early atmospheric models consisted of simple exponential functions with scale height factors that allowed the user to estimate a constant density at a given altitude. From these approaches and estimated density conditions, standard atmospheres were developed that were meant to represent the average conditions at any given point in time for a particular altitude. However, it was soon obvious that the atmosphere was far too dynamic to be adequately represented by static approaches. The 1990s brought a new approach to improving atmospheric density modeling. Dynamic Calibration of the Atmosphere (DCA) involves estimating density corrections to a given atmospheric density model based upon the observed motion of satellites. The goal of atmospheric density dynamics research is to understand and characterize the dynamic nature of the extreme upper atmosphere and develop improved orbital prediction algorithms based upon this new understanding. Many indicators suggest that the extreme upper atmosphere is far more dynamic than what is accounted for in atmospheric density models used in orbit propagation. This paper explores the impact these dynamics have on the motion of satellites. Simulations show that unmodeled atmospheric density dynamics can greatly impact the orbit determination process and add kilometers of error to orbit predictions. (10 figures, 8 refs.)
DTIC
Artificial Satellites; Atmospheric Density; Atmospheric Models; Spacecraft Motion; Trajectories

20040050771 Massachusetts Inst. of Tech., Cambridge, MA
A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed
Miller, David W.; Enright, John P.; May 2002; 119 pp.; In English
Contract(s)/Grant(s): F49620-99-1-0217
Report No.(s): AD-A421095; MIT-SSL-5-02; AFRL-SR-AR-TR-04-0143; No Copyright; Avail: CASI; A06, Hardcopy

Distributed terrestrial computer systems employ middleware software to provide communications abstractions and reduce software interface complexity. Embedded applications are adopting the same approaches, but must make provisions to ensure that hard real-time temporal performance can be maintained. This thesis presents the development and validation of a middleware system tailored to spacecraft flight software development. Our middleware runs on the Generalized Flight Operations Processing Simulator (GFLOPS) and is called the GFLOPS Rapid Real-Time Development Environment (GRRDE). GRRDE provides publish-subscribe communication services between software components. These services help to reduce the complexity of managing software interfaces. The hard real-time performance of these services has been verified with General Timed Automata modelling and extensive run-time testing. Several example applications illustrate the use of GRRDE to support advanced flight software development. Two technology-focused studies examine automatic code generation and autonomous fault protection within the GRRDE framework. A simulation complex of the TechSat 21 distributed space-based radar mission highlights the utility of the approach for large-scale applications.
DTIC
Computer Programs; Computerized Simulation; Formation Flying; Real Time Operation; Satellite Networks; Simulators; Spheres

20040050792 Phillips Lab., Edwards AFB, CA
An Overview of the Air Force's Electric Propulsion Program
Perkins, David R.; Sep. 1993; 8 pp.; In English
Contract(s)/Grant(s): Proj-3058
Report No.(s): AD-A421125; PL-TP-93-3094; No Copyright; Avail: CASI; A02, Hardcopy

This paper discusses the electric propulsion technology development efforts being pursued by the USA Air Force. Discussion is provided on the electric propulsion efforts of Phillips Laboratory's Propulsion Directorate in basic research, exploratory development, as well as the Advanced Technology Transition Development effort that will result in a space flight experiment of a 26 kilo- watt arcjet. Also discussed is Phillips Laboratory's ELITE/SSTAR program and a brief discussion of the Aerospace Corporation electric propulsion efforts in support of the Air force's Space and Missile Systems Center.
DTIC
Electric Propulsion

20040050826 Air Force Research Lab., Detachment 15, Kihei Maui, HI
Systematic Effects in Color Photometry Data
Luu, K. K.; Snodgrass, Joshua; Sabol, Chris; Lambert, John V.; Hamada, Kris; Sep. 16, 2002; 11 pp.; In English
Contract(s)/Grant(s): F29601-00-D-0204; Proj-4868/4983
Report No.(s): AD-A421174; XC-AFRL/DET-15; No Copyright; Avail: CASI; A03, Hardcopy

Previous work with laboratory and field observations and computer simulations suggests that classes of spacecraft can be distinguished on the basis of their color or spectral properties. Empirical results also indicate that accounting for systematic effects reduces much of the observed scatter and thus increases separability of the classes. We seek to gain an understanding of the basic properties of satellite features that determine the spectral characteristics of individual satellites: surface materials and scattering properties, combination of materials, shape, orientation, illumination-viewing geometries, etc. Initial efforts have focused on systematic effects of solar phase angle on object brightness and color data.
DTIC
Artificial Satellites; Color; Photometry

16
SPACE TRANSPORTATION AND SAFETY

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information see also *03 Air Transportation and Safety; 15 Launch Vehicles and Launch Operations*; and *18 Spacecraft Design, Testing and Performance*. For space suits see *54 Man/System Technology and Life Support*.

20040045308 NASA, Washington, DC, USA
Columbia Shuttle Recovery Operations, April 1, 2003
[2003]; 1 pp.; In English; No Copyright; Avail: CASI; A01, Hardcopy

This is a map of the debris scattering from the Columbia accident over parts of Texas and Louisiana. It depicts the location of recovered debris, and identifies regional facilities important to the recovery effort.
CASI
Columbia (Orbiter); Position (Location); Debris

17
SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes space systems telemetry; space communications networks; astronavigation and guidance; and spacecraft radio blackout. For related information see also *04 Aircraft Communications and Navigation*; and *32 Communications and Radar*.

20040045319 NASA Glenn Research Center, Cleveland, OH, USA
Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design
Slywezak, Richard A.; February 2004; 28 pp.; In English
Contract(s)/Grant(s): WBS 22-258-90-05
Report No.(s): NASA/TM-2004-212299; NAS 1.15:212299; E-13863; No Copyright; Avail: CASI; A03, Hardcopy

This report presents a design concept for a low-Earth-orbit end-to-end Internet-Protocol- (IP-) based mission. The goal is to maintain an up-to-date communications infrastructure that makes communications seamless with the protocols used in terrestrial computing. It is based on the premise that the use of IPs will permit greater interoperability while also reducing costs and providing users the ability to retrieve data directly from the satellite. However, implementing an IP-based solution also has a number of challenges, since wireless communications have different characteristics than wired communications. This report outlines the design of a low-Earth-orbit end-to-end IP-based mission; the ideas and concepts of Space Internet architectures and networks are beyond the scope of this document. The findings of this report show that an IP-based mission is plausible and would provide benefits to the user community, but the outstanding issues must be resolved before a design can be implemented.
Author
Internets; Low Earth Orbits; Protocol (Computers); Satellite Communication

18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and spacecraft control and stability characteristics. For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance; 39 Structural Mechanics*; and *16 Space Transportation and Safety*.

20040045247 NASA Ames Research Center, Moffett Field, CA, USA
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield
Chen, Y.-K.; Milos, Frank S.; [2003]; 17 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

A formulation of finite-rate ablation surface boundary conditions, including oxidation, nitridation, and sublimation of carbonaceous material with pyrolysis gas injection, has been developed based on surface species mass conservation. These surface boundary conditions are discretized and integrated with a Navier-Stokes solver. This numerical procedure can predict aerothermal heating, chemical species concentration, and carbonaceous material ablation rate over the heatshield surface of re-entry space vehicles. In this study, the gas-gas and gas-surface interactions are established for air flow over a carbon-phenolic heatshield. Two finite-rate gas-surface interaction models are considered in the present study. The first model is based on the work of Park, and the second model includes the kinetics suggested by Zhluktov and Abe. Nineteen gas phase

chemical reactions and four gas-surface interactions are considered in the present model. There is a total of fourteen gas phase chemical species, including five species for air and nine species for ablation products. Three test cases are studied in this paper. The first case is a graphite test model in the arc-jet stream; the second is a light weight Phenolic Impregnated Carbon Ablator at the Stardust re-entry peak heating conditions, and the third is a fully dense carbon-phenolic heatshield at the peak heating point of a proposed Mars Sample Return Earth Entry Vehicle. Predictions based on both finite-rate gas- surface interaction models are compared with those obtained using B' tables, which were created based on the chemical equilibrium assumption. Stagnation point convective heat fluxes predicted using Park's finite-rate model are far below those obtained from chemical equilibrium B' tables and Zhluktov's model. Recession predictions from Zhluktov's model are generally lower than those obtained from Park's model and chemical equilibrium B' tables. The effect of species mass diffusion on predicted ablation rate is also examined.
Author
Heat Shielding; Boundary Conditions; Ablative Materials; Carbonaceous Materials; Surface Properties; Surface Vehicles

20040045253 Science Applications International Corp., USA
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft
Mulloth, Lila; Perry, Jay; LeVan, Douglas; January 2004; 1 pp.; In English; 34th International Conference on Environmental Systems, 19-22 Jul. 2004, Colorado Springs, CO, USA; No Copyright; Avail: Other Sources; Abstract Only

The capabilities of NASA's existing environmental control and life support (ECLS) system designs are inadequate for future human space initiatives that involve long-duration space voyages and interplanetary missions. This paper discusses the concept of an integrated system of CO2 removal and trace contaminant control units that utilizes novel gas separation and purification techniques and optimized thermal and mechanical design, for future spacecraft. The integration process will enhance the overall life and economics of the existing systems by eliminating multiple mechanical devices with moving parts.
Author
Life Support Systems; Systems Integration; Air Purification; Spacecrews; Interplanetary Spacecraft; NASA Space Programs; Mechanical Engineering

20040045294 NASA Ames Research Center, Moffett Field, CA, USA, Eloret Corp., Moffett Field, CA, USA
Ceramic Foams for TPS Applications
Stockpoole, Mairead; December 09, 2003; 1 pp.; In English; ACerS Meeting, 18-21 Apr. 2004, Indianapolis, IN, USA; No Copyright; Avail: Other Sources; Abstract Only

Ceramic foams have potential in many areas of Thermal Protection Systems (TPS) including acreage and tile leading edges as well as being suitable as a repair approach for re-entry vehicles. NASA Ames is conducting ongoing research in developing lower-density foams from pre-ceramic polymer routes. One of the key factors to investigate, when developing new materials for re-entry applications, is their oxidation behavior in the appropriate re-entry environment which can be simulated using ground based arc jet (plasma jet) testing. Arc jet testing is required to provide the appropriate conditions (stagnation pressures, heat fluxes, enthalpies, heat loads and atmospheres) encountered during flight. This work looks at the response of ceramic foams (Si systems) exposed to simulated reentry environments and investigates the influence of microstructure and composition on the material response. Other foam properties (mechanical and thermal) will also be presented.
Author
Ceramics; Foams; Thermal Protection; Heat Flux; Leading Edges

20040046903 Institute for Scientific Research, Fairmont, WV, USA
The Super Lightweight Interchangeable Carrier (SLIC) Project
March 30, 2004; 3 pp.; In English
Contract(s)/Grant(s): NCC5-642; No Copyright; Avail: CASI; A01, Hardcopy

The Super Lightweight Interchangeable Carrier (SLIC) Grant consists of two separate but related phases. The first phase of this grant was conducted under a separate Institute for Scientific Research, Inc. (ISR) subcontract to FMW Composite Systems, Inc., of Bridgeport, West Virginia. FMW conducted early design and engineering associated with the future development of a stronger and lighter Space Shuttle carrier pallet. This improved pallet is intended to support the next and last planned Shuttle servicing mission for the on-orbit Hubble Space Telescope (HST). The salient characteristics of this carrier are increased performance, together with significantly reduced mass. As the next servicing mission is the last planned upgrade mission for the HST, this lighter and stronger pallet will enable greater payload delivery to the HST, potentially increasing the servicing mission effectiveness and science lifetime of the telescope. The second phase of this grant, conducted by ISR,

consisted of a data systems study to exploit further the potential of the HST servicing pallet for other space missions, specifically for application of semi-permanent placement of science payloads on the International Space Station (ISS). As in the case of the HST, a lightweight and more rigid pallet could be employed to increase science return for the ISS. A data systems study intended to complement the current ISS s Institutional data system holds the potential of increasing the science return for data efficiency, just as the lightweight pallet serves to increase payload mass efficiency.
Author
Weight Reduction; Weighting Functions; Space Transportation System Flights; Delivery; Data Systems

20040050283 ISRO Satellite Centre, Peenya, Bangalore, India
Journal of Spacecraft Technology, Volume 14, No. 1
Thyagarajan, K., Editor; Narayana, K. Badari, Editor; Jain, Y. K., Editor; Sastry, S. V. K., Editor; Sridhar, M. S., Editor; Martin, Kamalini, Editor; Venkateswaralu, A., Editor; January 2004; ISSN 0971-1600; 68 pp.; In English; Copyright; Avail: Other Sources

The Journal of Spacecraft Technology is a biannual publication of ISRO Satellite Centre, Bangalore, India. It is devoted exclusively to research and development in the fields of space and spacecraft technology and is meant for circulation amongst the professionals in the field. The contents include the following: High Resolution Current / Voltage Measuring Technique in Spacecraft. Structural Dynamic Studies of a Solar Array for an Agile Spacecraft. Generation of Thinned Star Catalogs for Onboard Applications of Indian Remote Sensing Satellites. 4 kbps Digital BPSK Demodulator - A Proto Type Design, Simulation and Testing. Heavy Ion Testing of VLSI Devices for Single Event Effects.
Derived from text
Demodulators; Heavy Ions; Solar Arrays; Remote Sensing; Electric Potential

20040050928 NASA, Washington, DC, USA
National Aeronautics and Space Administration STS-1 First Space Shuttle Mission Press Kit
March 18, 1981; 47 pp.; In English
Report No.(s): Release No: 81-39; No Copyright; Avail: CASI; A03, Hardcopy

The Space Shuttle orbiter Columbia, first in a planned fleet of spacecraft in the nation's Space Transportation System, will liftoff on its first orbital shakedown flight in April 1981. Launch will be no earlier than 45 minutes after sunrise from the NASA Kennedy Space Center Launch Complex 39A. Crew for the first orbital flight will be John W. Young, commander, veteran of two Gemini and two Apollo space flights, and U.S. Navy Capt. Robert L. Crippen, pilot. Crippen has not flown in space. Columbia will have no payloads in the payload bay on this first orbital flight, but will carry instrumentation for measuring orbiter systems performance in space and during its glide through the atmosphere to a landing after 54 1/2 hours. Extensive testing of orbiter systems, including the space radiators and other heat rejection systems, fills most of the STS-1 mission timeline. The clamshell-like doors on Columbia's 4.6 by 18-meter (15 by 60-foot) payload bay will be opened and closed twice during the flight for testing door actuators and latch mechanisms in the space environment. Other tests will measure performance of maneuvering and attitude thrusters, the Columbia's computer array and avionics 'black boxes,' and, during entry, silica-tile heatshield temperatures.
Derived from text
Aerospace Environments; Apollo Flights; Flight Tests; Payloads

20040050936 NASA, Washington, DC, USA
Apollo 7 - Press Kit
October 06, 1968; 103 pp.; In English; Original contains black and white illustrations
Report No.(s): NASA-News-Release-68-168K; No Copyright; Avail: CASI; A06, Hardcopy

Contents include the following: General release. Mission objectives. Mission description. Flight plan. Alternate missions. Experiments. Abort model. Spacecraft structure system. The Saturn 1B launch vehicle. Flight sequence. Launch preparations. Mission control center-Houston. Manned space flight network. Photographic equipment. Apollo 7 crew. Apollo 7 test program.
CASI
Apollo Spacecraft; Flight Plans; Manned Space Flight Network; Photographic Equipment

19
SPACECRAFT INSTRUMENTATION AND ASTRIONICS

Includes the design, manufacture, or use of devices for the purpose of measuring, detecting, controlling, computing, recording, or processing data related to the operation of space vehicles or platforms. For related information see also *06 Avionics and Aircraft Instrumentation*; for spaceborne instruments not integral to the vehicle itself see *35 Instrumentation and Photography*; for spaceborne telescopes and other astronomical instruments see *89 Astronomy*.

20040045254 Lockheed Martin Technical Operations, Inc., Greenbelt, MD, USA
Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design
Pace, Gregory; Wignarajah, Kanapathipillai; Pisharody, Suresh; Fisher, John; [2004]; 1 pp.; In English; 34rd International Conference on Environmental Systems Meeting, 19-22 Jul. 2004, Colorado Springs, Co, USA
Contract(s)/Grant(s): 131-20-10; No Copyright; Avail: Other Sources; Abstract Only

This paper describes development at NASA Ames Research Center of a heat melt compactor that can be used on both near term and far term missions. Experiments have been performed to characterize the behavior of composite wastes that are representative of the types of wastes produced on current and previous space missions such as International Space Station, Space Shuttle, MIR and Skylab. Experiments were conducted to characterize the volume reduction, bonding, encapsulation and biological stability of the waste composite and also to investigate other key design issues such as plastic extrusion, noxious off-gassing and removal of the of the plastic waste product from the processor. The experiments provided the data needed to design a prototype plastic melt waste processor, a description of which is included in the paper.
Author
Waste Disposal; Fabrication; Stability; Encapsulating

20
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 15 Launch Vehicles and Launch Operations*, and *44 Energy Production and Conversion*.

20040045325 NASA Glenn Research Center, Cleveland, OH, USA
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model
Regan, Timothy F.; Gerber, Scott S.; Roth, Mary Ellen; February 2004; 11 pp.; In English; Space Technology and Applications International Forum, 2-5 Feb. 2003, Albuquerque, NM, USA
Contract(s)/Grant(s): WBS 22-755-12-14
Report No.(s): NASA/TM-2004-212941; E-14381; No Copyright; Avail: CASI; A03, Hardcopy

A dynamic model for a free-piston Stirling convertor is being developed at the NASA Glenn Research Center. The model is an end-to-end system model that includes the cycle thermodynamics, the dynamics, and electrical aspects of the system. The subsystems of interest are the heat source, the springs, the moving masses, the linear alternator, the controller, and the end-user load. The envisioned use of the model will be in evaluating how changes in a subsystem could affect the operation of the convertor. The model under development will speed the evaluation of improvements to a subsystem and aid in determining areas in which most significant improvements may be found. One of the first uses of the end-toend model will be in the development of controller architectures. Another related area is in evaluating changes to details in the linear alternator.
Author
Dynamic Models; Stirling Cycle; Electromechanics; Block Diagrams; Stirling Engines

20040050647 Ohio State Univ., Columbus, OH
Transport in Plasma Thrusters Using Complex Propellants
Turchi, Peter J.; Mar. 2004; 80 pp.; In English
Contract(s)/Grant(s): F49620-98-1-0085; Proj-2308
Report No.(s): AD-A420889; AFRL-SR-AR-TR-04-0145; No Copyright; Avail: CASI; A05, Hardcopy

Theoretical modeling of ablation-fed, pulsed plasma thrusters (PPTs) with the MACH2 code has shown that after repeated pulsed operation, the total expelled mass is due to ablation during the discharge and solid decomposition that persists long after the pulse. The latter mass does not considerably contribute to the impulse-bit thus degrading thruster performance. For the rectangular PPT geometry, optimizing current waveforms in combination with channel widths are presented, that utilize all decomposed mass, electromagnetically. These waveforms are characterized by short rise times (<1 microsec) and prolonged

decays (>25 micro sec). Simplified modeling based on steady-state, one- dimensional flow reveals that the mass flow rate varies linearly with the square of the magnetic field and that the downstream flow speed is driven towards the Alfven wave speed when the magnetic pressure is much greater than the gasdynamic pressure. The model has been confirmed by MACH2. The mass flow requirement for such magnetosonic flow in turn, determines the surface temperature of the solid.
DTIC
Plasma Engines; Propellants

23
CHEMISTRY AND MATERIALS (GENERAL)

Includes general research topics related to the composition, properties, structure, and use of chemical compounds and materials as they relate to aircraft, launch vehicles, and spacecraft. For specific topics in chemistry and materials see *categories 25 through 29*. For astrochemistry see category *90 Astrophysics*.

20040046885 NASA Ames Research Center, Moffett Field, CA, USA
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments
Ellerby, Don; Beckman, Sarah; Irby, Edward; Johnson, Sylvia M.; Gunsman, Michael; Gasch, Matthew; Ridge, Jerry; Martinez, Ed; Squire, Tom; Olejniczak, Joe, et al.; [2003]; 22 pp.; In English; 55th Pacific Coast Regional and Basic Science Division Fall Meeting, 19-22 Oct. 2003, Oakland, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

The objectives of this research are to: 1) Investigate the oxidation/ablation behavior of HfB2/SiC materials in simulated re-entry environments; 2) Use the arc jet test results to define appropriate use environments for these materials for use in vehicle design. The parameters to be investigated include: surface temperature, stagnation pressure, duration, number of cycles, and thermal stresses.
Derived from text
Hafnium Compounds; Borides; Silicon Carbides; Reentry Effects; Atmospheric Entry Simulation; Materials Tests

20040046998 Helsinki Univ. of Technology, Espoo, Finland
Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace
Xia, J.; Ahokainen, T.; Kankaanpaeae, T.; 2003; In English
Report No.(s): PB2004-102205; TKK-MK-147; Copyright; Avail: National Technical Information Service (NTIS)

A numerical investigation of three-dimensional flows in a slag cleaning furnace has been carried out. Focus is put on effects of the electric potential, the electrode immersion depth, and the boundary conditions of the furnace wall and the slag surface on flow and heat transfer. Results show that both the electric potential and the electrode immersion depth have significant influence on flow and heat transfer in the slag. Reasonable range of the electric potential is about 150-170 V and the reasonable immersion depth of electrodes should be about half way of the slag height for the conditions considered. In practical operation one can use a smaller immersion depth with a higher electric potential or a larger immersion depth with a lower electric potential. Effects of heat loss rates of both the furnace sidewall and the slag surface on slag flows are examined, and it is demonstrated that these heat loss rates must be correctly calculated in order to reasonably predict the slag behavior in the furnace.
NTIS
Slags; Electric Potential; Furnaces

20040046999 Helsinki Univ. of Technology, Espoo, Finland
Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces
Xia, J.; Ahokainen, T.; 2003; In English
Report No.(s): PB2004-102206; TKK-MK-127; Copyright; Avail: National Technical Information Service (NTIS)

The present paper reports a numerical investigation of three-dimensional flow and heat transfer in the slag of an electric furnace. A constant electrode temperature and a constant electrode heat flux are used to simulate the electrode heating. The velocity vectors, temperature field, the turbulent kinetic energy, the heat loss rate from the slag surface and the mean slag temperature change with the electrode temperature or heat flux are given.
NTIS
Heat Transfer; Three Dimensional Flow; Electrodes

20040047006 Helsinki Univ. of Technology, Espoo, Finland
Seminar Course on Advanced Metallurgical Processes/2002
Kekkonen, M.; 2002; In English
Report No.(s): PB2004-102183; TKK-MK-141; Copyright; Avail: National Technical Information Service (NTIS)

The basic aim of the Seminar Course on Advanced Metallurgical Processes is to improve the students' knowledge on the newest progress in metallurgical processes, new technologies and trends of metallurgical industry as well as new alternative approaches to metals production. A holistic view into the process analysis and design is also emphasized. The course comprises of a series of lectures on selected topics e. g. direct reduction, direct smelting, novel refining processes and new progress in non-ferrous metallurgy.
NTIS
Metallurgy; Refining; Metals

20040047017 Helsinki Univ. of Technology, Espoo, Finland
Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions
Kersen, U.; 2003; 20 pp.; In English
Report No.(s): PB2004-104402; REPT-70; Copyright; Avail: National Technical Information Service (NTIS)

In this work, the mechanochemical processing of undoped nanocrystalline SnO2 powders and the subsequent preparation of thick films were studied. SnCl2 powder was milled with Ca(OH)2 and K2CO3 powder respectively in a ball-mill at room temperature and in an air atmosphere. Heat treatment of milled mixtures at 400 deg. C resulted in the formation of a tetragonal phase. The Fourier-transform infrared spectra (FTIR) and X-ray diffraction patterns (XRD) for the different powders are reported. A significant feature is that during milling in the presence of water a high number of OH groups are formed at the surface. After heat-treatment the OH bonds of adjacent SnO2 grains are probably transformed into Sn-O-Sn bridges. On exposure to H2S gas, the SnO2 film, prepared from anhydrous powder, has higher sensitivity than the SnO2 film, prepared from hydrated powder. It was found that with appropriate selection of milling conditions and chemical reaction, the obtained powder might be successfully applied to a H2S gas sensor.
NTIS
Detectors; Tin Oxides; Nanocrystals; Infrared Spectra

20040047261 Lawrence Livermore National Lab., Livermore, CA, USA, Northwestern Univ., Evanston, IL, USA
Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V
Schuh, C.; Dunand, D. C.; Sep. 10, 2001; 16 pp.; In English
Report No.(s): DE2004-15005677; UCRL-JC-144912; No Copyright; Avail: Department of Energy Information Bridge

The phenomenon of internal stress plasticity is observed in materials which are externally stressed while simultaneously experiencing internal mismatch strains. The external stress biases these mismatch strains, which develop (by a plastic deformation mechanism such as power-law creep) preferentially in the direction of the external stress. Internal stress plasticity is characterized by two main features at low applied stresses. First, the global deformation obeys a linear flow law, where the average strain rate during cycling is proportional to the applied stress. Second, because of its low stress exponent, internal stress plasticity occurs at a faster rate than creep in the absence of internal stresses. The combination of high flow stability and rapid deformation at low stresses makes internal stress plasticity of interest in shape forming; after multiple thermal or pressure cycles, this mechanism often leads to very large tensile elongation (> 100%) and is thus described as internal stress superplasticity
NTIS
Plastic Properties; Creep Properties; Superplasticity; Hydrogen; Residual Stress

20040050298 Lawrence Livermore National Lab., Livermore, CA
CTE and Ratchet Growth Measurements on LX17-1 and Constituents
Cunningham, B.; Weese, R.; Lewis, P.; Harwood, P.; Tran, T.; Feb. 22, 2002; 12 pp.; In English
Report No.(s): DE2004-15006120; UCRL-JC-147447; No Copyright; Avail: Department of Energy Information Bridge

Dimensional changes in PBX materials resulting from temperature change are of interest to engineers, designers and modelers. In this paper we present data from recent measurements made on LX17-1, as well as on the material's binder and its energetic constituent. LX17-1 is made from 7.5% KEL-F 800 binder combined with 92.5% wet aminated TATB energetic crystals. Due apparently to the anisotropic expansionary behavior of the TATB, the material exhibits irreversible growth, in addition to the usual reversible expansions and contractions associated with temperature change. In an effort understand

reversible and irreversible growth behavior and to verify consistency between our measurements and those made historically, measurements were performed on billet pressed LX17-1, on die pressed TATB, and on KEL-F alone. It is important to realize that, for materials involving TATB, expansionary behavior results from the combined effects of reversible and irreversible (ratchet growth) phenomena.
NTIS
Binders (Materials); Anisotropy; Growth

20040050321 Lawrence Livermore National Lab., Livermore, CA, University of the Pacific, Stockton, CA, USA
Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition
Chambers, D. M.; Brackett, C. L.; Sparkman, O. D.; Jul. 01, 2002; 24 pp.; In English
Report No.(s): DE2004-15005943; UCRL-JC-148956; No Copyright; Avail: Department of Energy Information Bridge
This report evaluates the large body of work involving the decomposition of PETN and identifies the major decomposition routes and byproducts. From these studies it becomes apparent that the PETN decomposition mechanisms and the resulting byproducts are primarily determined by the chemical environment. In the absence of water, PETN can decompose through the scission of the O-NO2 bond resulting in the formation of an alkoxy radical and NO2. Because of the relatively high reactivity of both these initial byproducts, they are believed to drive a number of autocatalytic reactions eventually forming (NO2OCH2)3CCHO, (NO2OCH2)2C=CHONO2, NO2OCH=C=CHONO2, (NO2OCH2)3C-NO2, (NO2OCH2)2C(NO2)2, NO2OCH2C(NO2)3, and C(NO2)4 as well as polymer-like species such as di-PEHN and tri-PEON. Surprisingly, the products of many of these proposed autocatalytic reactions have never been analytically validated. Conversely, in the presence of water, PETN has been shown to decompose primarily to mono, di, and tri nitrates of pentaerythritol.
NTIS
Explosives; Petn; Decomposition

20040050386 Lawrence Livermore National Lab., Livermore, CA
Computational Simulations of High Intensity X-Ray Interaction
London, R. A.; Bionta, R. M.; Tatchyn, R. O.; Roesler, S.; Aug. 02, 2001; 18 pp.; In English
Report No.(s): DE2004-15006293; UCRL-JC-142074; No Copyright; Avail: Department of Energy Information Bridge
Free electron lasers have the promise of producing extremely high-intensity short pulses of coherent, monochromatic radiation in the 1-10 keV energy range. For example, the Linac Coherent Light Source at Stanford is being designed to produce an output intensity of 2 x 10(sup 14) W/cm(sup 2) in a 230 fs pulse. These sources will open the door to many novel research studies. However, the intense x-ray pulses may damage the optical components necessary for studying and controlling the output. At the full output intensity, the dose to optical components at normal incidence ranges from 1-10 eV/atom for low-Z materials (Z<14) at photon energies of 1 keV. It is important to have an understanding of the effects of such high doses in order to specify the composition, placement, and orientation of optical components, such as mirrors and monochromators. Doses of 10 eV/atom are certainly unacceptable since they will lead to ablation of the surface of the optical components. However, it is not precisely known what the damage thresholds are for the materials being considered for optical components for x-ray free electron lasers. In this paper, we present analytic estimates and computational simulations of the effects of high-intensity x-ray pulses on materials. We outline guidelines for the maximum dose to various materials and discuss implications for the design of optical components.
NTIS
Materials Tests; X Rays

20040050393 Geological Survey, Reston, VA, USA
Mineral Commodity Summaries, 2004
2004; 204 pp.; In English
Report No.(s): PB2004-103193; No Copyright; Avail: CASI; A10, Hardcopy
Mineral Commodity Summaries are published on an annual basis. This report is the earliest Government publication to furnish estimates covering nonfuel mineral industry data. Data sheets contain information on the domestic industry structure, Government programs, tariffs, and 5-year salient statistics for more than 90 individual minerals and materials.
NTIS
Commodities; Data Structures; Minerals

20040050610 NASA Marshall Space Flight Center, Huntsville, AL, USA

Control of Convection in Containerless Processing

Hyers, R. W.; Matson, D. M.; Kelton, K. F.; Rogers, J. R.; [2004]; 1 pp.; In English; The Minerals, Metals and Materials Society Annual Meeting, 14-18 Mar. 2004, Charlotte, NC, USA; No Copyright; Avail: Other Sources; Abstract Only

Many different containerless processing techniques are employed in materials research, with the common goals of eliminating chemical reactions with the crucible and reducing heterogeneous nucleation sites. Each containerless method has different driving forces for flow in a liquid sample, and each has different relations between the flow variables and the process parameters. Often more than one technique is required to achieve the objectives of an experimental program. For example, one project requires solidification experiments over a range of almost two orders of magnitude in flow velocity, in both laminar and turbulent flow, while another requires a particular combination of shear rate and cooling rate, leading to a different processing strategy. The results of a modeling effort to determine the best combination of methods to meet the requirements of these two different experimental programs are presented.

Author

Convection; Models; Solidification; Flow Velocity; Shear; Cooling

20040050639 Aerospace Corp., El Segundo, CA

Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines

Coleman, D. J.; Judeikis, H. S.; Lang, V.; Oct. 1996; 42 pp.; In English

Contract(s)/Grant(s): F04701-88-C-0089

Report No.(s): AD-A318118; AL/EQ-TR-1993-0029; No Copyright; Avail: CASI; A03, Hardcopy

Measurements have been made of the reactions between ozone and hydrazine (HZ), monomethylhydrazine (MMH) and unsymmetrical dimethylhydrazine (UDMH). Measurements were carried out, at room temperature, under pseudo-first-order conditions (hydrazines in excess), in a flow system designed to minimize diffusion limitations and wall reactions. Second-order rate constants were measured for each of the reactions. Measured values for the reactions of ozone with HZ, MMH and UDMH are 3.4 + or - 0.4 x 10(exp -15) 4.5 + or - 0.5 x 10(exp - 14) and 5.5 + or - 1.3 x 10(exp -14) cu cm/molecule/sec, respectively. These values are compared to other measurements for gas-phase and aqueous-phase reactions. In addition, use of simple dispersion models suggests that these rate constants are sufficiently high that reactions with ambient 50 ppb levels of ozone will be important in the atmosphere. Such reactions could significantly limit transport of a hydrazine(s) containing spill cloud from an accidental spill site. Application of this chemistry to sophisticated computer spill models that are being developed is discussed.

DTIC

Constants; Hydrazines; Ozone; Reaction Kinetics; Vapor Phases

20040050743 Pennsylvania State Univ., University Park, PA

Simulation of Reaction Dynamics for Synthesis of Energetic Materials and Resistant Coatings

Hammes-Schiffer, Sharon; Mar. 10, 2004; 14 pp.; In English

Contract(s)/Grant(s): F49620-01-1-0046

Report No.(s): AD-A421049; AFRL-SR-AR-TR-04-0160; No Copyright; Avail: CASI; A03, Hardcopy

The objective of this research was the development of theoretical and computational methods to guide the efficient synthesis of HEDM (High Energy Density Matter) for use in advanced propellants and POSS (polyhedral oligomeric silsesquioxanes) for use in coatings resistant to extreme conditions such as heat and abrasion. The research centered on the design of new methodology for the simulation of hydrogen transfer reactions. The projects included the development of the following three types of approaches: grid methods for the calculation of hydrogen vibrational wave functions, nonadiabatic molecular dynamics methods for the simulation of proton transfer in liquids, and the nuclear-electronic orbital method for the incorporation of nuclear quantum effects in electronic molecular orbital calculations. The application of these approaches to hydrogen transfer reactions required for the synthesis of HEDM and POSS will provide insight into the detailed mechanisms, as well as the influence of solvent and substituents on the rates and yields. Such mechanistic information will aid in the efficient synthesis of HEDM and POSS and the design of new materials.

DTIC

Molecular Dynamics; Simulation

24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

20040046148 NASA Glenn Research Center, Cleveland, OH, USA
Oxidation of Ultra-High Temperature Ceramics in Water Vapor
Nguyen, QuynGiao N.; Robinson, Raymond C.; Opila, Elizabeth J.; [2004]; 23 pp.; In English; 227th American Chemical Society National Meeting, 28 Mar. - 1 Apr. 2004, Anaheim, CA, USA
Contract(s)/Grant(s): WBS 22-714-20-09; No Copyright; Avail: CASI; A03, Hardcopy

Ultra High Temperature Ceramics (UHTCs) including HfB2 + 20% SiC (HS), and ZrB2 + 20% SiC (ZC), and ZrB2 + 30% C + 14% SiC (ZCS) have been investigated for use as potential aeropropolsion engine materials. These materials were oxidized in water vapor (90%) using a cyclic vertical furnace at 1 atm. The total exposure time was 10 hours at temperature of 1200, 1300, and 1400 C. CVD SiC was also evaluate as a baseline for comparison. Weight change, X-ray diffraction analysis, surface and cross-sectional SEM and EDS were performed. These results are compared with tests conducted in a stagnant air furnace at temperatures of 1327 C for 100 minutes, and with high pressure burner rig (HPBR) results at 1100 and 1300 C at 6 atm for 50 h. Total recession measurements are also reported for the two tests environments.
Author (revised)
Oxidation; High Temperature; Ceramics; Water Vapor; Weight Analysis

20040046878 NASA Ames Research Center, Moffett Field, CA, USA
Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications
Stackpoole, Mairead; Chien, Jennifer; Schaeffler, Michelle; January 2004; 21 pp.; In English; 55th Pacific Coast Regional and Basic Science Division Fall Meeting, 19-22 Oct. 2003, Oakland, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the following: Motivation. Current light weight insulation. Advantages of preceramic-polymer-derived ceramic foams. Rigid insulation materials. Tailor foam microstructures. Experimental approach. Results: sacrificial materials, sacrificial fillers. Comparison of foam microstructures. Density of ceramic foams. Phase evolution and properties: oxidation behavior. mechanical properties, aerothermal performance. Impact damage of microcellular foams. Conclusions.
CASI
Foams; Ceramics; Polymers; Thermal Protection; Mechanical Properties

20040046887 NASA Glenn Research Center, Cleveland, OH, USA
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques
Rosario-Castro, Belinda I.; Cabrera, Carlos R.; Perez-Davis, Maria; Lebron, Marisabel; Meador, Michael; [2003]; 1 pp.; In English; Materials Research Society 2003 Fall Meeting, 1-5 Dec. 2003, Boston, MA, USA
Contract(s)/Grant(s): NGT3-52381; 22-319-20-Y1; No Copyright; Avail: CASI; A01, Hardcopy

Single-wall carbon nanotubes (SWNTs) are very interesting materials because of their morphology, electronic and mechanical properties. Its morphology (high length-to-diameter ratio) and electronic properties suggest potential application of SWNTs as anode material for lithium ion secondary batteries. The introduction of SWNTs on these types of sources systems will improve their performance, efficiency, and capacity to store energy. A purification method has been applied for the removal of iron and amorphous carbon from the nanotubes. Unpurified and purified SWNTs were characterized by transmission electron microscopy (TEM), and thermogravimetric analysis (TGA). In order to attach carbon nanotubes on platinum electrode surfaces, a self-assembled monolayer (SAM) of 4-aminothiophenol (4-ATP) was deposited over the electrodes. The amino-terminated SAM obtained was characterized by cyclic voltammetry, X-ray photoelectron spectroscopy (XPS), and Fourier-transforms infrared (FTIR) spectroscopy. Carbon nanotubes were deposited over the amino-terminated SAM by an amide bond formed between SAM amino groups and carboxylic acid groups at the open ends of the carbon nanotubes.This deposition was characterized using Raman spectroscopy and Scanning Electron microscopy (SEM).
Author
Carbon Nanotubes; Electrical Properties; Mechanical Properties; Morphology; Photoelectron Spectroscopy; Scanning Electron Microscopy; Transmission Electron Microscopy; Platinum

20040046926 NASA Langley Research Center, Hampton, VA, USA

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction

Turner, Travis L.; Buehrle, Ralph D.; Cano, Roberto J.; Fleming, Gary A.; March 30, 2004; 12 pp.; In English; SPIE 11th Annual International Symposium on Smart Structures and Materials, 14-18 Mar. 2004, San Diego, CA, USA

Contract(s)/Grant(s): 23-762-55-MO

Report No.(s): SPIE Paper 5390-36; No Copyright; Avail: CASI; A03, Hardcopy

This study presents the status and results from an effort to design, fabricate, and test an adaptive jet engine chevron concept based upon embedding shape memory alloy (SMA) actuators in a composite laminate, termed a SMA hybrid composite (SMAHC). The approach for fabricating the adaptive SMAHC chevrons involves embedding prestrained Nitinol actuators on one side of the mid-plane of the composite laminate such that thermal excitation generates a thermal moment and deflects the structure. A glass-epoxy pre-preg/Nitinol ribbon material system and a vacuum hot press consolidation approach are employed. A versatile test system for control and measurement of the chevron deflection performance is described. Projection moire interferometry (PMI) is used for global deformation measurement and infrared (IR) thermography is used for 2-D temperature measurement and feedback control. A recently commercialized constitutive model for SMA and SMAHC materials is used in the finite element code ABAQUS to perform nonlinear static analysis of the chevron prototypes. Excellent agreement is achieved between the predicted and measured chevron deflection performance, thereby validating the design tool. Although the performance results presented in this paper fall short of the requirement, the concept is proven and an approach for achieving the performance objectives is evident.

Author

Engine Design; Fabrication; Performance Tests; Noise Reduction; Jet Aircraft Noise; Shape Memory Alloys; Temperature Measurement

20040047279 NASA Glenn Research Center, Cleveland, OH, USA

Development of Ceramic Matrix Composites For High Temperature Applications

Heimann, Paula; [2004]; 2 pp.; In English

Contract(s)/Grant(s): NCC3-934; No Copyright; Avail: CASI; A01, Hardcopy

The microstructure and mechanical properties of carbon fiber reinforced silicon carbide (C/SiC) composites that incorporated molecular-level oxidation inhibitors designed to increase the material s high temperature durability were characterized. The viability of a fiber-level inhibitor incorporated as part of a layered interface system as well as a molecularly-integrated matrix-level oxidation inhibitor that is co-deposited with the SiC matrix during Chemical Vapor Infiltration (CVI) was determined. It was expected that the inhibitor would act as a glass former that will getter the oxygen and form a crack sealant to reduce further ingress of oxygen into the composite. Three composites were examined. Composite A was a baseline C(sub f)/SiC(sub m) composite that incorporated a approx. 0.4 micron pyrolytic carbon (PyC) fiber coating to promote strength and toughness, and a CVI-derived SiC matrix. Composite B was a C(sub f)/SiC(sub m) composite incorporating a approx 0.4 micron pyrolytic carbon (PyC) fiber coating to promote strength and toughness, a approx. 0.6 micron B4C fiber-level oxidation barrier coating, and a CVI-derived SiC matrix. Composite C was a C(sub f) /SiC(sub m) composite that incorporated a approx. 0.4 micron pyrolytic carbon (PyC) fiber coating to promote strength and toughness, a approx. 0.6 micron B4C fiber-level oxidation barrier coating, and a BxC-SiC oxidation-inhibited matrix produced by CVI co-deposition. All composites were reinforced with 10 plies of T-300 balanced plain weave carbon fabric with 3K tows at 12.5 ends per inch.

Derived from text

Ceramic Matrix Composites; Product Development; High Temperature; Carbon Fibers; Silicon Carbides; Mechanical Properties

20040050344 BAE Systems Analytical Solutions, Inc., Huntsville, AL, USA, Alabama Univ., Tuscaloosa, AL, USA

Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition

Catalina, Adrian V.; Stefanescu, Doru M.; Sen, Subhayu; [2004]; 1 pp.; In English; Transactions Mineral and Metals Annual Conference, 14-18 Mar. 2004, Charlotte, NC, USA

Contract(s)/Grant(s): NAS8-02096; No Copyright; Avail: Other Sources; Abstract Only

The distribution of ceramic particles in a metal matrix composite material depends primarily on the interaction of the particles with the solid/liquid interface during the solidification process. A numerical model that describes the evolution of the shape of the solid/liquid interface in the proximity of a foreign particle will presented in this paper. The model accounts for the influence of the temperature gradient and the Gibbs-Thomson and disjoining pressure effects. It shows that for the systems characterized by k(sub p) < k(sub L) the disjoining pressure causes the interface curvature to change its sign in the

close-contact particle/interface region. It also shows that the increase of the temperature gradient diminishes the effect of the disjoining pressure. The analysis of the numerical results obtained for a large range of processing conditions and materials parameters has led to the development of an analytical solution for the critical velocity of pushing/engulfinent transition. The theoretical results will be discussed and compared with the experimental measurements performed under microgravity conditions.
Author
Metal Matrix Composites; Ceramics; Liquid-Solid Interfaces

20040050394 Arkansas Univ., Fayetteville, AR, USA
Repair of Damaged Concrete Structures Using Prepreg Composites
2003; 40 pp.; In English
Report No.(s): PB2004-103413; MBTC-2033; No Copyright; Avail: CASI; A03, Hardcopy

In this study, two fast curing resins were used to repair predamaged RC columns. They were 1.5-hour heat activated curing prepreg and 20-minute ultraviolet curing resin. A 24-hour curing epoxy was also used for comparison purposes. A total of 24 steel reinforced Phi 152.4 mm x 609.6 mm small-scale concrete columns were designed, cast, cured, surface prepared, and predamaged. The damaged samples were repaired using the three types of E-glass fabric reinforced resins. An accelerated conditioning using boiling seawater and ultraviolet radiation was also conducted to investigate the hygrothermal durability of the repaired samples. Uniaxial compression test was conducted on both control samples and conditioned samples. The test results and cost/benefit analysis results show that the two fast curing resins can replace the currently used long-time curing resins in repairing damaged RC columns. A finite element analysis using ANSYS was also conducted to investigate the effect of fiber orientation on the stress-strain distributions of FRP wrapped concrete columns. A total of twenty-one Phi 152.4 mm x 304.8 mm concrete columns were prepared and tested to validate the analysis. The test and analysis results show that aligning some fibers in axial direction may be more preferable for real columns.
NTIS
Concrete Structures; Durability; Curing; Fabrics; Fiber Orientation; Maintenance; Stress-Strain Relationships

20040050582 Ohio Aerospace Inst., Cleveland, OH, USA
SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET
Morscher, Gregory N.; [2003]; 9 pp.; In English; No Copyright; Avail: CASI; A02, Hardcopy

Within the NASA UEET program, physics-based residual strength and rupture life models are being developed for a variety of time-temperature-stress-environment conditions for SiC/SiC components such as combustor liners and vanes. During service, a tensile stress condition that could be life-limiting typically occurs on the 'cold side' of these components due to thermal gradients and attachment schemes. An intermediate temperature (600 to 1000 C) stress-rupture model has been developed based on the underlying physical processes, i.e., oxygen penetration through matrix cracks, oxidation of the BN interphase, and subsequent fiber-fiber fusion within crack-bridging tows that eventually fail in time due to time-dependent strength degradation of the weakest fibers. Modifications to the model will be discussed to incorporate different environmental conditions as well as changes in oxidation kinetics due to improved interphase concepts.
Author
Silicon Carbides; Ceramic Matrix Composites; Life (Durability); Residual Strength; Rupturing

20040051019 California Inst. of Tech., Pasadena, CA, USA
Global Failure Modes in Composite Structures for High Altitudes
Knauss, W. G.; March 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG1-02029; No Copyright; Avail: CASI; A01, Hardcopy

This report summarizes the accomplishments under the referenced grant. The work described was started under the guidance and supervision of the late Dr. James Stames as the technical contact. It was aimed at investigating the development of analysis tools to deal with the problem of rupture in reinforced structural skin of future composites-based aircraft. It was of particular interest to assess methods by which failure features reminiscent of cracks in metallic structures would develop and propagate in fiber reinforced structures in interaction with the reinforcing frame. To eventually achieve that goal it was necessary to first understand the stress or strain distribution at the front of such features so that interactions between such features and reinforcing agents could be assessed computationally. Thus the major emphasis here was on the assessment of damage front and methods on how to assess or characterize it. During the conduct of this research program Dr. Stames changed to a different NASA- internal assignment, which divorced him of the direct supervision of this grant. A student who was

approximately % into the completion of his Ph.D. research needed to finish this work, and NASA funds were made available under Dr. Damodar Ambur, the successor Branch Manager for Dr. James Starnes, for the completion of this work. The current grant was the thus a new and fmal support increment for completion of the started research. Final reports for previous funding have been completed and submitted. Because of the interconnection of this last phase of the investigation with previous work it is deemed useful to make the Ph.D. thesis by Luis Gonzales the body of this report.
Derived from text
Composite Structures; Failure Modes; High Altitude; Stress-Strain Relationships; Cracks; Fiber Composites

25
INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

Includes the analysis, synthesis, and use of inorganic and organic compounds; combustion theory; electrochemistry; and photochemistry. For related information see category *34 Fluid Dynamics and Thermodynamics*. For astrochemistry see category *90 Astrophysics*.

20040045259 Civil Aerospace Medical Inst., Oklahoma City, OK, USA
The Formation of Ethanol in Postmortem Tissues
Johnson, Robert D.; Lewis, Russell J.; Angier, Mike K.; Vu, Nicole T.; February 2004; 14 pp.; In English
Contract(s)/Grant(s): AM-B-02-TXO-204
Report No.(s): DOT/FAA/AM-04/4; No Copyright; Avail: CASI; A03, Hardcopy

During the investigation of aviation accidents, postmortem samples obtained from fatal accident victims are submitted to the FAA's Civil Aerospace Medical Institute for toxicological analysis. During toxicological evaluations, ethanol analysis is performed on all cases. Many species of bacteria, yeast and fungi have the ability to produce ethanol and other volatile organic compounds in postmortem specimens. The potential for postmortem ethanol formation complicates the interpretation of ethanol-positive results from accident victims. Therefore, the prevention of ethanol formation at all steps following specimen collection is a priority. Sodium fluoride is the most commonly used preservative for postmortem specimens. Several studies have been published detailing the effectiveness of sodium fluoride for the prevention of ethanol formation in blood and urine specimens; however, our laboratory receives blood or urine in approximately 70% of cases. Thus, we frequently rely on tissue specimens for ethanol analysis. The postmortem tissue specimens received by our laboratory have generally been subjected to severe trauma and may have been exposed to numerous microbial species capable of ethanol production. With this in mind, we designed an experiment utilizing unadulterated tissue specimens obtained from aviation accident victims to determine the effectiveness of sodium fluoride at various storage temperatures for the prevention of microbial ethanol formation. We found that without preservative, specimens stored at 4 C for 96 h showed an average increase in ethanol concentration of 1470%. At 25'C, these same specimens showed an average ethanol increase of 1432% after 48 h. With the addition of 1.0O% sodium fluoride, there was no significant increase in ethanol concentration at either temperature.
Author
Aircraft Accident Investigation; Tissues (Biology)

20040046962 Lawrence Livermore National Lab., Livermore, CA
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi
Rodgers, A.; Al-Amri, A. M. S.; Ar-Rajehi, A.; Al-Khalifah, T.; Al-Amri, M. S.; Apr. 19, 2000; 22 pp.; In English
Report No.(s): DE2004-15005704; UCRL-ID-138770; No Copyright; Avail: Department of Energy Information Bridge

Two large chemical explosions were detonated in the Dead Sea in order to calibrate seismic travel times and improve location accuracy for the International Monitoring System (IMS) to monitor a Comprehensive Nuclear Test-Ban Treaty (CTBT). These explosions provided calibration data for regional seismic networks in the Middle East. In this paper we report analysis of seismic data from these shots as recorded by two seismic networks run by King Saud University (KSU) and King Abdulaziz City for Science and Technology (KACST) in Saudi Arabia. The shots were well observed in the distance range 180-480 km mostly to the south of the Dead Sea in the Gulf of Aqaba region of northwestern Saudi Arabia. An average one-dimensional velocity model for the paths was inferred from the travel times of the regional phases Pn, Pg and Sg. Short-period Sn phases were not observed. The velocity model features a thin crust (crustal thickness 26-30 km) and low velocities (average P-wave velocity 5.8-6.0 lcds), consistent with the extensional tectonics of the region and previous studies.
NTIS
Seismology; Chemical Explosions

20040047028 Environmental Protection Agency, Las Vegas, NV, USA

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons

Werkema, D. D.; Atekwana, E. A.; Duris, J.; Rossbach, S.; Smart, L.; 2004; In English; This document is color dependent and/or in landscape layout. It is currently available on CD-ROM and paper only. CD-ROM contains a 11 page document. This paper was published in the Proceedings for the Symposium on the Application of Geophysics to Engineering and Environmental Problems Held Feb 22-26, 2004

Report No.(s): PB2004-104384; No Copyright; Avail: National Technical Information Service (NTIS)

The results of a field and laboratory investigation of unconsolidated sediments contaminated by petroleum hydrocarbons and undergoing natural biodegradation are presented. Fundamental to geophysical investigations of hydrocarbon impacted sediments is the assessment of how microbial degradational processes affect their geoelectrical response. Therefore, the primary goal of this study was to understand how microbially mediated processes in hydrocarbon impacted sediments influence the geoelectrical response of this impacted zone. The field and laboratory results showed higher bulk conductivity in sediments impacted by petroleum hydrocarbons. The impacted sediments also showed increased populations of alkane degrading microbes and elevated dissolved cations. The elevated cations in the contaminated sediments relative to uncontaminated sediments suggest enhanced mineral dissolution related to the microbial degradation of the hydrocarbon. Both the laboratory and field data showed the highest bulk conductivities occurring within zones impacted with the free-phase and residual phase hydrocarbon and not within the water saturated zone.

NTIS

Hydrocarbons; Petroleum Products; Conductivity; Microorganisms; Electrodes

20040047090 Lawrence Livermore National Lab., Livermore, CA

Probing Interactions in Complex Molecular Systems through Ordered Assembly

De Yoreo, J. J.; Bartelt, M. C.; Orme, C. A.; Villacampa, A.; Weeks, B. L.; Jan. 31, 2002; 22 pp.; In English

Report No.(s): DE2003-15005556; UCRL-ID-147035; No Copyright; Avail: Department of Energy Information Bridge

Emerging from the machinery of epitaxial science and chemical synthesis, is a growing emphasis on development of self-organized systems of complex molecular species. The nature of self-organization in these systems spans the continuum from simple crystallization of large molecules such as dendrimers and proteins, to assembly into large organized networks of nanometer-scale structures such as quantum dots or nanoparticles. In truth, self-organization in complex molecular systems has always been a central feature of many scientific disciplines including fields as diverse as structural biology, polymer science and geochemistry. But over the past decade, changes in those fields have often been marked by the degree to which researchers are using molecular-scale approaches to understand the hierarchy of structures and processes driven by this ordered assembly. At the same time, physical scientists have begun to use their knowledge of simple atomic and molecular systems to fabricate synthetic self-organized systems. This increasing activity in the field of self-organization is testament to the success of the physical and chemical sciences in building a detailed understanding of crystallization and epitaxy in simple atomic and molecular systems, one that is soundly rooted in thermodynamics and chemical kinetics. One of the fundamental challenges of chemistry and materials science in the coming decades is to develop a similarly well-founded physical understanding of assembly processes in complex molecular systems. Over the past five years, we have successfully used in situ atomic force microscopy (AFM) to investigate the physical controls on single crystal epitaxy from solutions for a wide range of molecular species. More recently, we have combined this method with grazing incidence X-ray diffraction and kinetic Monte Carlo modeling in order to relate morphology to surface atomic structure and processes. The purpose of this proposal was to extend this approach to assemblies of three classes of 'super molecular' nanostructured materials. These included (1) dendrimers, (2) DNA bonded nano-particles, and (3) colloids, all of which form solution-based self-organizing systems. To this end, our goals were, first, to learn how to modify models of epitaxy in small molecule systems so that they are useful, efficient, and applicable to assembly of super-molecular species; and, second, to learn how systematic variations in the structure and bonding of the building blocks affect the surface kinetics and energetics that control the assembly process and the subsequent dynamic behavior of the assembled structures. AFM imaging provided experimental data on morphology and kinetics, while kinetic Monte Carlo (KMC) simulations related these data to molecular-scale processes and features.

NTIS

Molecular Structure; Complex Systems; Synthesis (Chemistry); Dynamic Characteristics

20040047251 NASA Marshall Space Flight Center, Huntsville, AL, USA

Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase

Ciszak, Ewa M.; Korotchkina, Lioubov G.; Dominiak, Paulina M.; Sidhu, Sukdeep; Patel, Mulchand S.; The Journal of Biological Chemistry; June 06, 2003; Volume 278, No. 23, pp. 21240-21246; In English

Contract(s)/Grant(s): NAG8-1841; NIH-DK-20478; Copyright; Avail: Other Sources

The derivative of vitamin B1, thiamin pyrophosphate, is a cofactor of enzymes performing catalysis in pathways of energy production. In alpha (sub 2) beta (sub 2)-heterotetrameric human pyruvate dehydrogenase, this cofactor is used to cleave the C(sup alpha) -C(=O) bond of pyruvate followed by reductive acetyl transfer to lipoyl-dihydrolipoamide acetyltransferase. The dynamic nonequivalence of two, otherwise chemically equivalent, catalytic sites has not yet been understood. To understand the mechanism of action of this enzyme, we determined the crystal structure of the holo-form of human pyruvate dehydrogenase at 1.95-Angstrom resolution. We propose a model for the flip-flop action of this enzyme through a concerted approximately 2-Angstrom shuttle-like motion of its heterodimers. Similarity of thiamin pyrophosphate binding in human pyruvate dehydrogenase with functionally related enzymes suggests that this newly defined shuttle-like motion of domains is common to the family of thiamin pyrophosphate-dependent enzymes.

Author

Pyruvates; Thiamine; Dehydrogenation; Enzymes; Molecular Structure

20040047260 Lawrence Livermore National Lab., Livermore, CA

Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine

Weese, R. K.; Maienschein, J. L.; Perrino, C. T.; Sep. 05, 2001; 20 pp.; In English

Report No.(s): DE2004-15005676; UCRL-JC-145325; No Copyright; Avail: Department of Energy Information Bridge

We apply Differential Scanning Calorimetry, DSC, to measure the kineticsof the(beta)(yields)(delta) solid-solid phase transition of Octahydro-1,3,5, 7-tetranitro- 1,3,5,7-tetrazocinet HMX. Integration of the DSC signal gives a direct measurement of degree of conversion. We apply 1st order kinetics, the Ozawa method, and isoconversional analysisto show that the phase transition is not a simple one-step reaction, butinstead is a complex combination of steps. The range of activation energies found in this work, centering around 500 kJ/mol, is higher thanpreviously reported values. We discuss possible reasons for the higher activation energies measured here.

NTIS

Kinetics; Scanning; Heat Measurement

20040047272 Lawrence Livermore National Lab., Livermore, CA

Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation

Shestakov, A. I.; Milovich, J. L.; Noy, A.; Dec. 27, 2000; 12 pp.; In English

Report No.(s): DE2004-15005762; UCRL-JC-139342-R1; No Copyright; Avail: Department of Energy Information Bridge

The nonlinear Poisson-Boltzmann (PB) equation is solved using Pseudo Transient Continuation. The PB solver is constructed by modifying the nonlinear diffusion module of a 3D, massively parallel, unstructured grid, finite element, radiation-hydrodynamics code. The solver also computes the electrostatic energy and evaluates the force on a user-specified contour. Either Dirichlet or mixed boundary conditions are allowed. The latter specifies surface charges, approximates far-field conditions, or linearizes conditions ‘regulating’ the surface charge. The code may be run in either Cartesian, cylindrical, or spherical coordinates. The potential and force due to a conical probe interacting with a flat plate is computed and the result compared with direct force measurements by chemical force microscopy.

NTIS

Boltzmann Transport Equation; Cartesian Coordinates; Electrostatics; Boundary Conditions

20040050371 ICF, Inc., Fairfax, VA, USA

Health Effects Support Document for Manganese (February 2003)

Feb. 2003; 168 pp.; In English

Report No.(s): PB2004-104043; No Copyright; Avail: CASI; A08, Hardcopy

The U.S. Environmental Protection Agency (EPA) has prepared this Health Effects Support Document to assist in determining whether to establish a National Primary Drinking Water Regulation (NPDWR) for manganese. At high doses by inhalation, manganese is very toxic, as seen by occupational exposure in miners. On the other hand, manganese is essential

for normal physiological function of animals and humans. The Food and Nutrition Board of the National Academy of Science (NAS) sets an adequate intake for manganese at 2.3 mg/day for men and 1.8 mg/day for women, and an upper limit for daily intake at 11 mg for adults (IOM, 2002). Manganese has a low aesthetic threshold in water. Based on staining and taste, EPA has set a secondary level for manganese at 0. 05 mg/L which is below the level that may present a health concern. Available data suggest that regulation of manganese in public water does not present a meaningful basis for health risk reduction. EPA will present a determination and further analysis in the Federal Register Notice covering the Contaminant Candidate List proposals.
NTIS
Contaminants; Dosage; Exposure; Health; Manganese; Risk

20040050381 Lawrence Livermore National Lab., Livermore, CA
Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation
Hickman, D. P.; Maclean, S. C.; Shepley, D.; Shah, R. K.; Jul. 2001; 12 pp.; In English
Report No.(s): DE2004-15006257; UCRL-ID-145113; No Copyright; Avail: Department of Energy Information Bridge
The Hazards Control Department at Lawrence Livermore National Laboratory (LLNL) uses Inductively Coupled Plasma Mass Spectrometer (ICP/MS) technology to analyze uranium in urine. The ICP/MS used by the Hazards Control Department is a Perkin-Elmer Elan 6000 ICP/MS. The Department of Energy Laboratory Accreditation Program requires that the total error be assessed for bioassay measurements. A previous evaluation of the errors associated with the ICP/MS measurement of uranium demonstrated a (+-) 9.6% error in the range of 0.01 to 0.02(micron)g/l. However, the propagation of total error for concentrations above and below this level have heretofore been undetermined. This document is an evaluation of the errors associated with the current LLNL ICP/MS method for a more expanded range of uranium concentrations.
NTIS
Plasmas (Physics); Mass Spectrometers; Inductively Coupled Plasma Mass Spectrometry

20040050575 Kyoto Univ., Japan
Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry, Volume 45
March 2004; ISSN 0368-9689; 103 pp.; In English; Copyright; Avail: Other Sources
Time evolution of the 113s(sub 1/2) state of Rb-85 in a pulsed electric field was investigated at the region of the first avoided-crossing with its adjacent manifold. The state was initially prepared by laser excitations at a well isolated Stark position from the manifold, and driven into an electric field (FT) over the first avoided crossing point with various slew-rates. The s(sub 1/2) state was then field-ionized with a following high slew-rate pulsed electric field; Specifically in this field ionization process with high slew-rate regime, a constant transverse electric field was applied to enhance the tunneling field ionization process resulting from the angular momentum rotation due to the effect of a rotating electric field. Three paths through the Stark map were identified with sharp peaks in the ionization field-strength observed. One path corresponds to the autoionization-like process, while the other two paths are due to the tunneling processes with an adiabatic and a non-adiabatic transitions, respectively. Transition rates to these ionization paths, measured as a function of the slew rate, were found to be strongly dependent on how deep the state is driven into the manifold-merged region at F(sub r) before the fast ionization-pulse was subsequently applied. Quantum theoretical predictions, taking into account explicitly the occurrence of the multilevel avoided crossings, reproduce well the experimental transition rates to the paths leading to the tunneling field-ionization. The transitions leading to the autoionization-like process, however, show different behavior from those to the tunneling process, indicating an interference effect in the process.
Author
Astrophysics; Universities; Geophysics; Chemistry; Science

20040050662 Florida Univ., Gainesville, FL
Conjugated Polyelectrolytes: Synthesis and Applications
Pinto, Mauricio R.; Schanze, Kirk S.; Apr. 28, 2002; 18 pp.; In English
Contract(s)/Grant(s): DAAD19-00-1-0002
Report No.(s): AD-A420917; UF-NIF-10; ARO-40422.55-MS; No Copyright; Avail: CASI; A03, Hardcopy
Conjugated polyelectrolytes are conjugated polymers that feature ionic side groups which render the materials soluble in water and other polar solvents. In this review we summarize recent work which has been carried out to synthesize a variety of new conjugated polyelectrolyte structures, including those with poly(paraphenylene), poly(phenylene vinylene) and

poly(phenylene ethynylene) backbone structures. Work that has examined the optical, photophysical and solution properties of these materials is also reviewed. Finally, a brief survey of novel applications of conjugated polyelectrolytes to the fabrication of optoelectronic devices and fluorescent sensors is provided.
DTIC
Conjugation; Electrolytes

20040050772 Defence Research and Development Suffield, Suffield, Alberta
Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample
D'Agostino, Paul A.; Hancock, J. R.; Chenier, C. L.; Dec. 2003; 29 pp.; In English
Report No.(s): AD-A421096; DRDC-TM-2003-024; No Copyright; Avail: CASI; A03, Hardcopy

Packed capillary LC-ESI-MS and capillary column GC- MS were compared for the analysis of a synthetic tabun sample as each method has advantages for the analysis of samples containing chemical warfare agents, their hydrolysis products and related compounds. Twelve sample components were identified during LC-ESI-MS analysis of the sample, while only ten were detected by GC-MS. The two less volatile compounds not detected by GC-MS contained hydroxyl substitution and would only be detected by GC-MS following derivatization and a second GC-MS analysis. The total analysis times, including equilibration times between analyses, were similar, typically requiring about 40 to 45 minutes. Peak widths for capillary column GC-MS separations were typically an order of magnitude befter than packed capillary LO-ESI-MS, offering the potential to resolve more sample components during a given analysis. The relative sensitivity of the methods was estimated since the exact contribution of each sample component to the mixture used for comparison remains unknown. Interpretable full mass spectra and similar SIN ratios in the total-ion-current were observed for the trace sample components, estimated to be present in the low nanogram or subnanogram range, using both methods.
DTIC
Chemical Warfare; Gas Chromatography; Mass Spectroscopy

20040050929 NASA Langley Research Center, Hampton, VA, USA
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell
Kim, Jae-Woo; Choi, Sang H.; Lillehei, Peter T.; King, Glen C.; Watt, Gerald D.; Chu, Sang-Hyon; Park, Yeonjoon; Thibeault, Sheila; March 23, 2004; 9 pp.; In English; SPIE 11th Annual International Symposium on Smart Structures and Materials, 14-18 Mar. 2004, San Diego, CA, USA
Report No.(s): LAR-16758-1; LAR-16846-1; Copyright; Avail: CASI; A02, Hardcopy

Platinum-cored ferritins were synthesized as electrocatalysts by electrochemical biomineralization of immobilized apoferritin with platinum. The platinum cored ferritin was fabricated by exposing the immobilized apoferritin to platinum ions at a reduction potential. On the platinum-cored ferritin, oxygen is reduced to water with four protons and four electrons generated from the anode. The ferritin acts as a nano-scale template, a biocompatible cage, and a separator between the nanoparticles. This results in a smaller catalyst loading of the electrodes for fuel cells or other electrochemical devices. In addition, the catalytic activity of the ferritin-stabilized platinum nanoparticles is enhanced by the large surface area and particle size phenomena. The work presented herein details the immobilization of ferritin with various surface modifications, the electrochemical biomineralization of ferritin with different inorganic cores, and the fabrication of self-assembled 2-D arrays with thiolated ferritin.
Author
Biochemistry; Electrocatalysts; Nanoparticles; Fabrication; Electrochemical Synthesis; Iron; Biochemical Fuel Cells; Minerals; Platinum; Fuel Cells

26
METALS AND METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals and metallic materials; and metallurgy.

20040045246 NASA Ames Research Center, Moffett Field, CA, USA
Processing and Properties of HfB2 Based Materials
Johnson, Sylvia M.; Beckman, Sarah; Irby, Edward; Ellerby, Don; Gasch, Matthew; Gusman, Michael; [2003]; 20 pp.; In English; 55th Pacific Coast Regional and Basic Science Division Fall Meeting, 19-22 Oct. 2003, Oakland, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the following: Modified hot pressing schedule has significantly improved UHTC billet processing:

density and microstructure uniformity have improved. 2 in. dia. x 2 in. tall UHTC billets have been successfully hot pressed: scaled up billets have slightly higher density gradients axially than 1 in. billets. Hot press schedule has not been optimized for scaled up billets. Strengths and strength distributions are improving with experience: need to evaluate strength uniformity in the center of the billets. CTE or ARC materials compares favorably with heritage materials. Thermal conductivity of ARC materials considerably different than that of heritage materials.
Derived from text
Hot Pressing; Thermal Conductivity; Billets

20040045298 NASA Ames Research Center, Moffett Field, CA, USA
Materials Science Work at NASA Ames Research Center
Kuhns, Joy B.; Johnson, Sylvia; Stackpoole, Mairead; Loehman, Ron; Kotulas, Paul; [2003]; 29 pp.; In English
Report No.(s): Rept-90; No Copyright; Avail: CASI; A03, Hardcopy

The paper discusses the following: Thermal Protection System -TPS development and testing; Material for the shuttle; Ablators; Coating; Integrated vehicle health management; Sharp leading edges.
CASI
Management Planning; Ablative Materials; Thermal Protection; Performance Tests

20040045326 NASA Glenn Research Center, Cleveland, OH, USA
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process
Struk, Peter M.; Pettegrew, Richard D.; Downs, Robert S.; Watson, J. Kevin; February 2004; 16 pp.; In English; 42nd Aerospace Sciences Meeting and Exhibit, 5-8 Jan. 2004, Reno, NV, USA
Contract(s)/Grant(s): WBS 22-101-58-10
Report No.(s): NASA/TM-2004-212946; E-14386; AIAA Paper 2004-1311; No Copyright; Avail: CASI; A03, Hardcopy

An improved understanding of the effects of reduced gravity is important to applications of soldering during both current and future human space missions. Recently, we conducted a series of manual soldering experiments aboard NASA's KC-135 reduced gravity aircraft. This paper focuses on the interpretation of the unsteady (g-jitter) acceleration environment measured aboard the aircraft as it affects the experimental results. The results presented here use a through-hole geometry that was soldered with the same hardware that is currently on orbit aboard the International Space Station. As presented elsewhere, we observed significant changes in porosity and geometry of solder joints formed in reduced gravity. Based on acceleration measurements during periods when the solder was molten, we examined a data filtering technique to determine the influence of g-jitter on our data. The results of this filter indicate that joint geometry is largely unaffected by the unsteady variations in acceleration as seen aboard the KC-135. We deduced that the increase in voids observed in low gravity can be described by decreases in buoyancy driven bubble motion. An acceleration environment which oscillates about zero gravity further increases joint porosity by keeping bubbles within the joint. Additionally, by examining some partial gravity results we observed that acceleration levels near Martian levels and higher result in porosity data sets similar to our normal gravity results. This suggests the existence of a threshold acceleration level below which gravitational effects become important for joint porosity in the though-hole geometry. The techniques and interpretations presented in this paper may be beneficial to others using the KC-135 research aircraft.
Author
Soldering; Microgravity; Space Missions; Mars (Planet); Unsteady State; Gravitational Effects

20040046907 Containerless Research, Inc., Evanston, IL, USA
Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts
Guynes, Buddy, Technical Monitor; Weber, Richard; January 31, 2004; 11 pp.; In English
Contract(s)/Grant(s): NAS8-98092; No Copyright; Avail: CASI; A03, Hardcopy

The scientific objective of this research is to increase the fundamental knowledge base for liquid- phase processing of technologically important oxide materials. The experimental objective is to define conditions and hardware requirements for microgravity flight experiments to test and expand the experimental hypotheses that: 1. Liquid phase transitions can occur in undercooled melts by a diffusionless process. 2. Onset of the liquid phase transition is accompanied by a large change in the temperature dependence of melt viscosity. Experiments on undercooled YAG (Y3A15012)- and rare earth oxide aluminate composition liquids demonstrated a large departure from an Arrhenian temperature dependence of viscosity. Liquid YAG is nearly inviscid at its 2240 K melting point. Glass fibers were pulled from melts undercooled by ca. 600 K indicating that the viscosity is on the order of 100 Pans (1000 Poise) at 1600 K. This value of viscosity is 500 times greater than that obtained

by extrapolation of data for temperatures above the melting point of YAG. These results show that the liquids are extremely fragile and that the onset of the highly non-Arrhenian viscosity-temperature relationship occurs at a temperature considerably below the equilibrium melting point of the solid phases. Further results on undercooled alumina-yttria melts containing 23-42 mole % yttrium oxide indicate that a congruent liquid-liquid phase transition occurs in the undercooled liquids. The rates of transition are inconsistent with a diffusion-limited process. This research is directed to investigation of the scientifically interesting phenomena of polyamorphism and fragility in undercooled rare earth oxide aluminum oxide liquids. The results bear on the technologically important problem of producing high value rare earth-based optical materials.
Derived from text
Microgravity; Liquid Phases; Aluminum Oxides; Yttrium Oxides; Experimentation; Phase Transformations; Gravitational Effects

20040047257 Lawrence Livermore National Lab., Livermore, CA, USA, High Energy Metals, Inc., Port Townsend, WA, USA
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer
Elmer, J. W.; Terrill, P.; Brahser, D.; Butler, D.; Jun. 12, 2001; 30 pp.; In English
Report No.(s): DE2004-15005672; UCRL-JC-144232; No Copyright; Avail: Department of Energy Information Bridge
A uranium alloy was joined to a high strength aluminum alloy using a commercially pure niobium interlayer. Joining of the Nb interlayer to the aluminum alloy was performed using an explosive welding process, while joining the Nb interlayer to the uranium alloy was performed using an electron beam welding process. Explosive welding was selected to bond the Nb to the aluminum alloy in order to minimize the formation of brittle intermetallic phases. Electron beam welding was selected to join the Nb to the uranium alloy in order to precisely control melting so as to minimize mixing of the two metals. A Modified Faraday Cup (MFC) technique using computer-assisted tomography was employed to determine the power distribution of the electron beam so that the welding parameters could be directly transferred to other welding machines. Optical microscopy, scanning electron microscopy, microhardness, and tensile testing of the welds were used to characterize the resulting joints. This paper presents the welding techniques and processing parameters that were developed to produce high integrity ductile joints between these materials.
NTIS
Electron Beam Welding; Niobium Compounds; Aluminum Alloys; Uranium Alloys

20040047265 NASA Marshall Space Flight Center, Huntsville, AL, USA
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment
Grugel, R. N.; Anilkumar, A. V.; Lee, C. P.; January 2004; 1 pp.; In English; Minerals, Metals & Materials Society (TMS) Annual Meeting, 14-18 Mar. 2004, Charlotte, NC, USA; No Copyright; Avail: Other Sources; Abstract Only
In support of the Pore Formation and Mobility Investigation (PFMI) direct observation of experiments on the controlled melting and subsequent resolidification of succinonitrile were conducted in the glovebox facility (GBX) of the International Space Station (ISS). Samples were prepared on ground by filling glass tubes, 1 cm ID and approximately 30 cm in length, with pure succinonitrile (SCN) and SCN-Water mixtures under 450 millibar of nitrogen. Experimental processing parameters of temperature gradient and translation speed, as well as camera settings, were remotely monitored and manipulated from the ground Telescience Center (TSC) at the Marshall Space Flight Center. Sample temperatures are monitored by six in situ thermocouples. Real time visualization during melt back revealed bubbles of different sizes initiating at the solid/liquid interface, their release, interactions, and movement into the temperature field ahead of them. Subsequent re-solidification examined planar interface breakdown and the transition to steady-state dendritic growth. A preliminary analysis of the observed phenomena and its implication to future microgravity experiments is presented and discussed.
Author
Observation; Melting; Solidification; Nitrites; Microgravity; Steady State; Gravitational Effects

20040047266 Lawrence Livermore National Lab., Livermore, CA, USA
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity
Frary, M.; Schuh, C.; Dunand, D. C.; Oct. 23, 2001; 16 pp.; In English
Report No.(s): DE2004-15005684; UCRL-JC-146024; No Copyright; Avail: Department of Energy Information Bridge
By thermally cycling through their transformation temperature range, coarse-grained, polymorphic materials can be deformed superplastically, owing to the emergence of transformation mismatch plasticity (or transformation superplasticity)

as a deformation mechanism. This mechanism is investigated under biaxial stress conditions during thermal cycling of unalloyed titanium, and their composites. During gas-pressure dome bulging experiments, the dome height was measured as a function of forming time. Adapting existing models of biaxial doming to the case of transformation superplasticity where the strain-rate sensitivity is unity, we verify the operation of this deformation mechanism in all experimental materials, and compare the biaxial results to uniaxial thermal cycling results on the same materials. Finally, existing thickness distribution models are compared with experimentally measured profiles.
NTIS
Thermal Cycling Tests; Superplasticity; Adaptive Optics; Titanium Alloys

20040047271 Lawrence Livermore National Lab., Livermore, CA
Recent Developments in Understanding Five-Power-Law Creep in Metals
Kassner, M. E.; Perez-Prado, M. T.; Rosen, R. S.; Bergsma, S. C.; Apr. 08, 2000; 10 pp.; In English
Report No.(s): DE2004-15005761; UCRL-JC-138715; No Copyright; Avail: Department of Energy Information Bridge
This work describes recent advances on the effects of subgrain boundaries on elevated-temperature plasticity. Particular attention is devoted to recent developments regarding internal back-stresses. This will include discussions of recent convergent beam electron diffraction (CBED) experiments on metals to evaluate internal stresses in association with dislocation heterogeneities.
NTIS
Creep Properties; Metals; Convergence

20040047280 Massachusetts Univ., Amherst, MA, USA
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys
Hyers, Robert; Bradshaw, Richard C.; Rogers, Jan C.; Rathz, Thomas J.; Lee, Geun W.; Gangopadhyay, Anup K.; Kelton, Kenneth F.; January 2004; 1 pp.; In English; Minerals, Metals & Materials Society (TMS) Annual Meeting, 14-18 Mar. 2004, Charlotte, NC, USA; No Copyright; Avail: Other Sources; Abstract Only
The surface tension, viscosity, density, and thermal expansion of Ti-Zr-Ni alloys were measured for a number of compositions by electrostatic levitation methods. Containerless methods greatly reduce heterogeneous nucleation, increasing access to the undercooled liquid regime at finite cooling rates. The density and thermal expansion are measured optically, while the surface tension and viscosity are measured by the oscillating drop method. The measured alloys include compositions which form a metastable quasicrystal phase from the undercooled liquid, and alloys close to the composition of several multi-component bulk metallic glass-forming alloys. Measurements of surface tension show behavior typical of transition metals at high temperature, but a sudden decrease in the deeply undercooled liquid for alloys near the quasicrystal-forming composition range, but not for compositions which form the solid-solution phase first.
Author
Thermophysical Properties; Titanium Alloys; Nickel Alloys; Zirconium Alloys; Levitation; Electrostatics; Containerless Melts

20040050274 Virginia Univ., Charlottesville, VA, USA, Rensselaer Polytechnic Inst., Troy, NY, USA
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy
Young, G. A.; Scully, J. R.; Apr. 2002; 24 pp.; In English
Report No.(s): DE2004-820717; LM-02K030; No Copyright; Avail: Department of Energy Information Bridge
Precipitation hardenable Al-Zn-Mg alloys are susceptible to hydrogen environment assisted cracking (HEAC) when exposed to aqueous environments. In Al-Zn-Mg-Cu alloys, overaged tempers are used to increase HEAC resistance at the expense of strength but overaging has little benefit in low copper alloys. However, the mechanism or mechanisms by which overaging imparts HEAC resistance is poorly understood. The present research investigated hydrogen uptake, diffusion, and crack growth rate in 90% relative humidity (RH) air for both a commercial copper bearing Al-Zn-Mg-Cu alloy (AA 7050) and a low copper variant of this alloy in order to better understand the factors which affect HEAC resistance. Experimental methods used to evaluate hydrogen concentrations local to a surface and near a crack tip include nuclear reaction analysis (NRA), focused ion beam, secondary ion mass spectroscopy (FIB/SIMS) and thermal desorption spectroscopy (TDS). Results show that overaging the copper bearing alloys both inhibits hydrogen ingress from oxide covered surfaces and decreases the apparent hydrogen diffusion rates in the metal.
NTIS
Aluminum Alloys; Bearing Alloys; Zinc Alloys; Crack Propagation; Surface Cracks; Magnesium Alloys

20040050275 Lehigh Univ., Bethlehem, PA, USA, Lockheed Martin Corp., Syracuse, NY, USA
Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel
Papworth, A. J.; Knorr, D. B.; Williams, D. B.; Aug. 2002; 10 pp.; In English
Report No.(s): DE2004-820718; LM-02K058; No Copyright; Avail: Department of Energy Information Bridge

The segregation of alloying and impurity elements to prior austenite grain boundaries (PAGBs) in low-alloy steels controls temper-embrittlement although the precise microchemical and microstructural interactions are, as yet, unclear because of the many variables involved. Competing segregation and de-segregation phenomena are observed. For example, Auger analyses of fracture surfaces indicate that brittle fracture is caused by the segregation of P to the PAGB. The addition of small amounts (approx. 0.5 wt%) of Mo appears to regard, but not stop, temper-embrittlement, possibly due to Mo(sub 2)C precipitates that form at elevated temperatures causing de-segregation of Mo from the PAGB. The relationship between segregation and temper embrittlement is further complicated in commercial alloys by both the number of segregating elements and the complex, multi-stage heat treatments. Auger analysis pre-selects the most embrittled boundaries and so the complete distribution of segregants across all PAGBs cannot be determined by this technique. Previous work has shown how X-ray mapping (XRM) in a field-emission gun scanning transmission electron microscope (FEG-STEM) offers a more complete view of the distribution of segregants on both non-embrittled and embrittled PAGBs. XRM was used to observe the evolution of the segregation and de-segregation of five elements during four successive heat-treatment stages of commercial low-alloy steel forging. In the last and crucial temper-embrittlement stage, increases in the degree and frequency of Ni segregation occur while other elements either segregate, remain constant or desegregate from the PAGBs.
NTIS
Alloying; Austenite; Brittleness; Impurities; High Strength Steels; Fracturing

20040050361 Lawrence Livermore National Lab., Livermore, CA
Connectivity in Random Grain Boundary Networks
Kumar, M.; Schuh, C. A.; King, W. E.; Oct. 22, 2002; 14 pp.; In English
Report No.(s): DE2004-15006313; UCRL-JC-139879; No Copyright; Avail: Department of Energy Information Bridge

Mechanical properties of FCC metals and alloys can be improved by exercising control over the population of grain boundary types in the microstructure. The existing studies also suggest that such properties tend to have percolative mechanisms that depend on the topology of the grain boundary network. With the emergence of SEM-based automated electron backscatter diffraction (EBSD), statistically significant datasets of interface crystallography can be analyzed in a routine manner, giving new insight into the topology and percolative properties of grain boundary networks. In this work, we review advanced analysis techniques for EBSD datasets to quantify microstructures in terms of grain boundary character and triple junction distributions, as well as detailed percolation-theory based cluster analysis.
NTIS
Alloys; Microstructure; Grain Boundaries

20040050363 Bettis Atomic Power Lab., West Mifflin, PA, USA
Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment
Wire, G. L.; Mills, W. J.; 2002; 24 pp.; In English
Report No.(s): DE2004-805335; No Copyright; Avail: Department of Energy Information Bridge

Fatigue crack propagation (FCP) rates for 304 stainless steel (304SS) were determined in 24 degree C and 288 degree C air and 288 degree C water using double-edged notch (DEN) specimens of 304 stainless steel (304 SS). Test performed at matched loading conditions in air and water at 288 degree C with with 20-60 cc h(sub)2/kg h(sub)2O provided a direct comparison of the relative crack growth rates in air and water over a wide range of crack growth rates. The DEN crack extension ranged from short cracks (0.03-0.25 mm) to long cracks up to 4. 06 mm, which are consistent with conventional deep crack tests. Crack growth rates of 304 SS in water were about 12 times the air rate. This 12X environmental enhancement persisted to crack extensions up to 4.06 mm, far outside the range associated with short crack effects. The large environmental degradation for 304 SS crack growth is consistent with the strong reduction of fatigue life in high hydrogen water. Further, very similar environmental effects w ere reported in fatigue crack growth tests in hydrogen water chemistry (HWC). Most literature data in high hydrogen water show only a mild environmental effect for 304 SS, of order 2.5 times air or less, but the tests were predominantly performed at high cyclic stress intensity or equivalently, high air rates. The environmental effect in low oxygen environments at low stress intensity depends strongly on both the stress ratio, R, and the load rise time, T(sub)r, as recently reported for austenitic stainless steel in BWR water. Fractography was performed for both tests in air and water. At 288 degree C in water, the fracture surfaces were crisply faceted with a crystallographic appearance, and showed striations

under high magnification. The cleavage-like facets on the fracture surfaces suggest that hydrogen embrittlement is the primary cause of accelerated cracking.
NTIS
Crack Propagation; Fatigue (Materials); Stainless Steels

20040050383 Lawrence Livermore National Lab., Livermore, CA
Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys
Bergsma, S. C.; Kassner, M. E.; Li, X.; Rosen, R. S.; Aug. 08, 2000; 12 pp.; In English
Report No.(s): DE2004-15006281; UCRL-JC-140091; No Copyright; Avail: Department of Energy Information Bridge
The purpose of this study is to investigate the quench sensitivity of mechanical properties of hot extruded 6061 and 6069 aluminum alloys. The relationship between mechanical properties and quench delzty time at various temperatures between 200-500 C was determined. It was concluded that the 6069-T6 was somewhat more quench sensitive than 6061, which may be consistent with the composition difference.
NTIS
Aluminum Alloys; Quenching (Cooling)

20040050625 NASA Glenn Research Center, Cleveland, OH, USA
Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al
Whittenberger, J. Daniel; March 2004; 33 pp.; In English
Contract(s)/Grant(s): WBS-22-708-31-04
Report No.(s): NASA/TM-2004-212947; NAS 1.15:212947; E-14237-1; No Copyright; Avail: CASI; A03, Hardcopy
The elevated temperature compressive properties of binary Fe-39.8 at % Al and Fe-15.6Mn-39.4Al have been measured between 1000 and 1300 K at strain rates between 10(exp 7) and 10(exp 3)/ s. Although the Mn addition to iron aluminide did not change the basic deformation characteristics, the Mn-modified alloy was slightly weaker. In the regime where deformation of FeAl occurs by a high stress exponent mechanism (n = 6), strength increases as the grain size decreases at least for diameters between approx. 200 and approx. 10 microns. Due to the limitation in the grain size-flow stress-temperature-strain rate database, the influence of further reductions of the grain size on strength is uncertain. Based on the appearance of subgrains in deformed iron aluminide, the comparison of grain diameters to expected subgrain sizes, and the grain size exponent and stress exponent calculated from deformation experiments, it is believed that grain size strengthening is the result of an artificial limitation on subgrain size as proposed by Sherby, Klundt and Miller.
Author
High Temperature; Manganese Alloys; Iron Aluminides; Deformation

20040050628 NASA Glenn Research Center, Cleveland, OH, USA
Generalization of Equivalent Crystal Theory to Include Angular Dependence
Ferrante, John; Zypman, Fredy R.; March 2004; 17 pp.; In English
Contract(s)/Grant(s): WBS-22-708-04-03
Report No.(s): NASA/TM-2004-212970; NAS 1.15:212970; E-14443; No Copyright; Avail: CASI; A03, Hardcopy
In the original Equivalent Crystal Theory, each atomic site in the real crystal is assigned an equivalent lattice constant, in general different from the ground state one. This parameter corresponds to a local compression or expansion of the lattice. The basic method considers these volumetric transformations and, in addition, introduces the possibility that the reference lattice is anisotropically distorted. These distortions however, were introduced ad-hoc. In this work, we generalize the original Equivalent Crystal Theory by systematically introducing site-dependent directional distortions of the lattice, whose corresponding distortions account for the dependence of the energy on anisotropic local density variations. This is done in the spirit of the original framework, but including a gradient term in the density. This approach is introduced to correct a deficiency in the original Equivalent Crystal Theory and other semiempirical methods in quantitatively obtaining the correct ratios of the surface energies of low index planes of cubic metals (100), (110), and (111). We develop here the basic framework, and apply it to the calculation of Fe (110) and Fe (111) surface energy formation. The results, compared with first principles calculations, show an improvement over previous semiempirical approaches.
Author
Anisotropy; Crystals; Flux Density; Ground State; Angular Momentum

20040050700 Oak Ridge Inst. for Science and Education, Aberdeen Proving Ground, MD
Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium
Jones, Tyrone L.; Feb. 2004; 25 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): 1120-1120-99
Report No.(s): AD-A420984; ARL-CR-0533; No Copyright; Avail: CASI; A03, Hardcopy

A Ti-6A1-4V baseline plate and a Russian titanium alloy plates were ballistically tested against .30-cal armor- piercing (AP) M2 rounds. The V(50) ballistic limit of each plate was determined and compared to the MIL-DTL-46077F V(50) ballistic acceptance chart for Ti-6Al-4V alloy. Based on these results, no clear ballistic performance advantage would be achieved by using the Russian titanium alloy against 0.30-cal AP M2 threats.
DTIC
Aluminum Alloys; Ballistics; Titanium; Titanium Alloys; Vanadium Alloys

20040050701 Army Research Lab., Aberdeen Proving Ground, MD
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology
Kurian, Mary K.; Dasgupta, Arnab; Galvin, Mary E.; Beyer, Frederick L.; Feb. 2004; 23 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAAD19-01-2-0001
Report No.(s): AD-A420985; ARL-TR-3136; No Copyright; Avail: CASI; A03, Hardcopy

Tbe morpbological bebavior of a series of polymer- layered silicate flaflocomposiWs (PLSNs) has been investigated. The goal was to probe the effect of %Wxtured' silicate surfaces on PLSN morphology. The nanocomposiWs were fabricated by mixin% montmorillonite clay that was carefully modified with tailor-made polystyrene (PS) surfactants into a PS homopolymer matrix, where the chemical similarity of the matrix polymer and surfactants ensures complete miscibility of surfactant and homopolymer. To examine the effect of silicate surface %texture,' clay was modified with combinations of long and short surtactants. The samples, characterized by small- angle x-ray scatwring (SAXS), were fl%en melt-am%ealed to allow the equilibrirn% morphology to develop. Based on fl%e implications of tac Balazs model and otaer work on tac wefling behavior of polymer melts, textured surfaces were expected to promote tac intercalation of the homopolymer matrix matenal into the modified clay. ExWnsive d%aracWrization of bota tac modified clays as well as tac resultant NANOCOMPOSIWs clearly showed that the modified clays exhibited a high degree of order, but also taat only phase-separated morphologies were fon%ed in the corresponding nanocomposiWs.
DTIC
Brushes; Morphology; Nanocomposites; Plastics; Polystyrene; Silicates; Silicones; Surfactants

27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see *24 Composite Materials*.

20040045263 NASA Ames Research Center, Moffett Field, CA, USA
Processing, Properties and Arc Jet Testing of HfB2/SiC
Johnson, Sylvia M.; Beckman, Sarah; Irby, Edward; Ellerby, Don; Gasch, Matt; Gusman, Michael; January 2004; 45 pp.; In English; Ultra-High Temperature Ceramic (UHTC) Materials Workshop, 5-7 Nov. 2003, Wintergreen, VA, USA; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the following: Background on Ultra High Temperature Ceramics - UHTCs. Summary UNTC processing: power processing, scale-up. Preliminary material properties: mechanical, thermal. Arc jet testing: flat face models, cone models. Summary.
CASI
Ceramics; High Temperature; Product Development

20040045290 NASA Ames Research Center, Moffett Field, CA, USA
Ablative Thermal Protection: An Overview
Lau, Bernie; [2003]; 22 pp.; In English; 55th Pacific Coast Regional and Basic Science Division Fall Meeting, 19-22 Oct. 2003, Oakland, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the following: Why ablative thermal protections - TPS. Ablative TPS chronology: strategic reentry

systems, solid rocket motor nozzles, space (manned missions and planetary entry probes). Ablation mechanisms. Ablation material testing. Ablative material testing.
Derived from text
Ablative Materials; Solid Propellant Rocket Engines; Nozzles; Materials Tests

20040046917 NASA Langley Research Center, Hampton, VA, USA, National Inst. of Aerospace Research, Hampton, VA, USA
Constitutive Modeling of Piezoelectric Polymer Composites
Odegard, Gregory M.; Gates, Tom, Technical Monitor; December 2003; 33 pp.; In English
Contract(s)/Grant(s): NCC1-02043; 762-30-51-03
Report No.(s): NASA/CR-2003-212681; NIA-2003-10; No Copyright; Avail: CASI; A03, Hardcopy

A new modeling approach is proposed for predicting the bulk electromechanical properties of piezoelectric composites. The proposed model offers the same level of convenience as the well-known Mori-Tanaka method. In addition, it is shown to yield predicted properties that are, in most cases, more accurate or equally as accurate as the Mori-Tanaka scheme. In particular, the proposed method is used to determine the electromechanical properties of four piezoelectric polymer composite materials as a function of inclusion volume fraction. The predicted properties are compared to those calculated using the Mori-Tanaka and finite element methods.
Author
Mathematical Models; Piezoelectricity; Models

20040046963 Lawrence Livermore National Lab., Livermore, CA
Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs
Ryerson, F. J.; Ebbinghaus, B.; May 25, 2000; 56 pp.; In English
Report No.(s): DE2004-15005705; UCRL-ID-139092; No Copyright; Avail: Department of Energy Information Bridge

Three compositions representing plutonium-free analogs of a proposed Ca-Ti-Gd-Hf- U-PU oxide ceramic for the immobilization of plutonium were equilibrated at 1 atm, 1350 degrees C over a range of oxygen fugacities between air and that equivalent to the iron-wustite buffer. The cerium analog replaces Pu on a mole-per-mole basic with Ce; the thorium analog replaces Pu with Th. A third material has 10 wt% Al2O3 added to the cerium analog to encourage the formation of a Hf-analog of, CaHfTi207, zirconolite, which is referred to as hafnolite. The predominant phase produced in each formulation under all conditions is pyrochlore, A2T207, where the T site is filled by Ti, and Ca, the lanthanides, Hf, U and Pu are accommodated on the A-site. Other lanthanide and uranium-bearing phases encountered include brannerite (UTi206), hafnolite (CaHfTi207), perovskite (CaTiO3) and a calcium-lanthanide alurninotitanate with nominal stoichiometry (CaJM)Ti2Al9O19, where Ln is a lanthanide.
NTIS
Ceramics; Plutonium; Radioactive Wastes

20040046964 Lawrence Livermore National Lab., Livermore, CA
Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results
Ryerson, F. J.; Ebbinghaus, B.; Kirkorian, O.; VanKonynenburg, R.; May 25, 2000; 96 pp.; In English
Report No.(s): DE2004-15005706; UCRL-ID-139093-P1; No Copyright; Avail: Department of Energy Information Bridge

The saturation of impurity-rich accessory phases in a Cc-analog baseline ceramic formulation for the immobilization of excess plutonium has been tested by synthesizing an impurity-rich baseline compositions at 1300 degrees C 1350 degrees C and 1400 degrees C in air. Impurity oxides are added at the 10 wt% level. The resulting phases assemblages are typically rich in pyrochlore, Hf-zirconolite (hafnolite), brannerite and rutile, but in many instances also contain an accessory mineral enriched in the impurity oxide. The concentration of that oxide in coexisting pyrochlore sets the saturation limit for solid solution of the component in question. In most cases, the accessory phase does not contain significant amounts of Ce, Gd or U. Exceptions are the stabilization of a Ca-lanthanide phosphate and a phosphate glass when P2O5 is added to the formulation. P2O3 addition is also very effective in reducing the modal amount of pyrochlore in the form relative to brannerite. Addition of the sodium-aluminosilicate, NaAISiO4, also results in the formation of a grain bounday melt at run conditions, but the fate of this phase on cooling is not well determined. At temperatures above 1300degreesC, addition of 10 wt percent Fe2O3 also leads to melting. Substitution of cations of different valences can also be associated with model-dependent changes in the

oxidation state of uranium via charge transfer reactions. A set of simple components is suggested for the description of pyrochlores in both impurity-free and impurity-rich formulations.
NTIS
Ceramics; Impurities; Titanates

20040047086 Energy and Environmental Resources, Inc, USA
Batch Preheat for Glass and Related Furnace Processing Operations
Fleming, W. J.; Aug. 2002; 22 pp.; In English
Report No.(s): DE2003-816025; No Copyright; Avail: Department of Energy Information Bridge
The objectives of this development work are: (1) Establish through lab tests a salt eutectic with a melting point of about 250 F and a working range of 250 to 1800 F. (2) Establish the most economical material of construction for the screened salt eutectics identified in the first objective. (3) Establish the material of construction for the salt heater liner.
NTIS
Research and Development; Eutectics; Salts; Glass

20040050175 Lawrence Livermore National Lab., Livermore, CA
Short Range Chemcial Ordering in Bulk Metallic Glasses
Sterne, P. A.; Asoka-Kumar, P.; Hartley, J. H.; Howell, R. H.; Nieh, T. G.; Jan. 03, 2001; 12 pp.; In English
Report No.(s): DE2004-15005859; UCRL-JC-159559; No Copyright; Avail: Department of Energy Information Bridge
We provide direct experimental evidence for a non-random distribution of atomic constituents in Zr-based multi-component bulk metallic glasses using positron annihilation spectroscopy. The Ti content around the open-volume regions is significantly enhanced at the expense of Cu and Ni, indicating that Cu and Ni occupy most of the volume bounded by their neighboring atoms while Ti and Zr are less closely packed and more likely to be associated with open-volume regions. Temperature-dependent measurements indicate the presence of at least two different characteristic sizes for the open volume regions. Measurements on hydrogen-charged samples show that the larger open-volume regions can be filled by hydrogen up to a critical density.
NTIS
Metallic Glasses; Atoms; Temperature Dependence

20040050292 Lawrence Livermore National Lab., Livermore, CA
Sound Speeds of Post-Failure Wave Glass
Cazamias, J. U.; Fiske, P. S.; Bless, S. J.; Jul. 25, 2000; 14 pp.; In English
Report No.(s): DE2004-15006126; UCRL-JC-139817; No Copyright; Avail: Department of Energy Information Bridge
Plate impact experiments were performed on B270 glass in order to measure the properties of post-failure wave material. The initial failure wave velocity is 1.27 km/s . After the material is released, the failure wave velocity drops to 0.65 km/s. At a stress of 6.72 GPa, the sound speed in the failed material is 4.97 km/s (compare to 5.79 km/s in the intact material) with a density comparable to the predicted shock value. At a stress of 0.26 GPa, the average sound speed in the failed material is 3.55 km/s, and the density drops to 65% of the intact value. The spall strength of the failed material is greater than 0.14 GPa.
NTIS
Failure; Glass; Acoustic Velocity; Sound Waves

20040050299 Lawrence Livermore National Lab., Livermore, CA
Ti-Cr-Al-O Thin Film Resistors
Jankowski, A. F.; Hayes, J. P.; Mar. 21, 2002; 24 pp.; In English
Report No.(s): DE2004-15006122; UCRL-JC-147866; No Copyright; Avail: Department of Energy Information Bridge
Thin films of Ti-Cr-Al-O are produced for use as an electrical resistor material. The films are rf sputter deposited from ceramic targets using a reactive working gas mixture of Ar and O(sub 2). Vertical resistivity values from 10(sup 4) to 10(sup 10) Ohm-cm are measured for Ti-Cr-Al-O films. The film resistivity can be design selected through control of the target composition and the deposition parameters. The Ti-Cr-Al-O thin film resistor is found to be thermally stable unlike other metal-oxide films.
NTIS
Ceramics; Resistors; Coatings

20040050311 Oak Ridge K-25 Site, TN, USA

Stability of ClO2 as a Product of Gas Phase Decontamination Treatments

Simmons, D. W.; Sep. 1994; 16 pp.; In English

Report No.(s): DE2004-820628; K/TCD-1116; No Copyright; Avail: Department of Energy Information Bridge

The gas phase decontamination project is investigating the use of chlorine trifluoride (ClF3) to fluorinate nonvolatile uranium deposits to produce uranium hexafluoride (UF6) gas. The potential existence of chlorine dioxide (ClO2) during gas phase decontamination with ClF(sub 3) has been the subject of recent safety discussions. Some of the laboratory data collected during feasibility studies of the gas phase process has been evaluated for the presence of ClO2 in the product gas stream. The preliminary evidence to date can be summarized as follows: (1) ClO2 was not detected in the flow loop in the absence of ClF3; (2) ClO2 was not detected in the static reactors in the absence of both ClF3 and ClF; and (3) ClO2 was detected in a static reactor in the absence of all fluorinating gases.

NTIS

Decontamination; Gas Streams; Fluorination

20040050539 NASA Marshall Space Flight Center, Huntsville, AL, USA

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity

Grugel, Richard N.; Anilkumar, A. V.; Lee, C. P.; [2004]; 1 pp.; In English; Minerals Metals and Materials Society (TMS) Annual Meeting, 14-18 Mar. 2004, Charlotte, NC, USA; No Copyright; Avail: Other Sources; Abstract Only

Detailed studies on the controlled melting and subsequent re-solidification of succinonitrile were conducted in the microgravity environment aboard the International Space Station (ISS) using the PFMI apparatus (Pore Formation and Mobility Investigation) located in the ISS glovebox facility (GBX). Samples were initially prepared on ground by filling glass tubes, 1 cm ID and approximately 30 cm in length, with pure succinonitrile (SCN) under 450 millibar of nitrogen. During Space processing, experimental parameters like temperature gradient and translation speed, for melting and solidification, were remotely monitored and controlled from the ground Telescience Center (TSC) at the Marshall Space Flight Center. Real time visualization during controlled melting revealed bubbles of different sizes initiating at the solid/liquid interface, and traveling up the temperature gradient ahead of them. Subsequent controlled re-solidification of the SCN revealed the details of porosity formation and evolution. A preliminary analysis of the melt back and re- solidification and its implications to future microgravity materials processing is presented and discussed.

Author

Bubbles; Liquid-Solid Interfaces; Solidification; Microgravity

20040050675 California Univ., Davis, CA

Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis

Kuntz, Joshua; Zhang, Guo-Dong; Mukherjee, Amiya; Jan. 2000; 13 pp.; In English

Contract(s)/Grant(s): DAAD-19-00-1-0185

Report No.(s): AD-A420946; ARO-40013.19-MS; No Copyright; Avail: CASI; A03, Hardcopy

Alumina based ceramic nanocomposites were investigated with the objective of improving fracture toughness. Specific focus during processing was directed at the retention of nanocrystalline microstructures in the matrix of the composites while still achieving full density. Second phases were added to the alumina matrix to investigate the applicability of toughening mechanisms that have been developed earlier for microcrystalline ceramics. The use of spark plasma sintering technique allowed the retention of ultrafine grain size of alumina due to lowered sintering temperatures and shorter sintering times. Very attractive improvements in fracture toughness were noted in Al2O3/Nb, Al2O3/ carbon nanotube, Al2O3/SiC whisker, and Al2O3/Nb/carbon nanotube composites. The results were analyzed in the context of effective toughening mechanisms in these nanocrystalline matrices.

DTIC

Ceramics; Covalence; Nanocomposites; Pyrolysis

20040050702 Army Research Lab., Aberdeen Proving Ground, MD

Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method

Morrill, Jason A.; Jensen, Robert E.; Madison, Phillip H.; Chabalowski, Cary F.; Feb. 2004; 30 pp.; In English

Report No.(s): AD-A420986; No Copyright; Avail: CASI; A03, Hardcopy

A designer Quantitative Structure-Property Relationsbip (QSPR) based upon molecular properties calculated using the AM1 semi-empirical quantum mechanical metbod was developed to predict the glass transition temperature (Tg) of an%ine-cured epoxy resins based on tbe diglycidyl etber of bisphenol A. The QSPR (R2 -0.9977) was generated using the regression analysis progran% Con%prebensive Descriptors for Structural and Statistical Analysis (CODESSA). By applying an ad hoc treatn%ent based on elen%entary probability fl%eory to fl%e quantitative structure-property relationship analysis a n%eil%od was developed for con%puting bulk polyn%er Tg for stoichion%etric and non-stoichion%eft-ic n%onon%eric fon%ulations. A n%odel polymer was synthesized and found to validate our model predictions.
DTIC
Amines; Copolymers; Epoxy Compounds; Epoxy Resins; Glass Transition Temperature

28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For nuclear fuels see *73 Nuclear Physics*. For related information see also *07 Aircraft Propulsion and Power; 20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

20040050782 NASA Stennis Space Center, Bay Saint Louis, MS, USA
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants
Figueroa, Fernando; Mitchell, Mark; Langford, Lester; May 18, 2004; 5 pp.; In English
Contract(s)/Grant(s): NAS13-650
Report No.(s): SE-2003-12-00109-SSC; No Copyright; Avail: CASI; A01, Hardcopy

Measurement of tank level, particularly for cryogenic propellants, has proven to be a difficult problem. Current methods based on differential pressure, capacitance sensors, temperature sensors, etc.; do not provide sufficiently accurate or robust measurements, especially at run time. These methods are designed to measure tank-level, but when the fluids are in supercritical state, the liquid-gas interface disappears. Furthermore, there is a need for a non-intrusive measurement system; that is, the sensors should not require tank modifications and/or disturb the fluids. This paper describes a simple, but effective method to determine propellant mass by measuring very small deformations of the structure supporting the tank. Results of a laboratory study to validate the method, and experimental data from a deployed system are presented. A comparison with an existing differential pressure sensor shows that the strain gage system provides a much better quality signal across all regimes during an engine test. Experimental results also show that the use of fiber optic strain gages (FOSG) over classic foil strain gages extends the operation time (before the system becomes uncalibrated), and increases accuracy. Finally, a procedure is defined whereby measurements from the FOSG mounted on the tank supporting structure are compensated using measurements of a FOSG mounted on a reference plate and temperature measurements of the structure. Results describing the performance of a deployed system that measures tank level during propulsion tests are included.
Author
Cryogenic Rocket Propellants; Fiber Optics; Strain Gages; Temperature Sensors; Systems Engineering; Propellant Tanks; Nonintrusive Measurement

29
SPACE PROCESSING

Includes space-based development of materials, compounds, and processes for research or commercial application. Also includes the development of materials and compounds in simulated reduced-gravity environments. For legal aspects of space commercialization see *84 Law, Political Science and Space Policy*.

20040047179 NASA Marshall Space Flight Center, Huntsville, AL, USA
Microgravity Materials Research and Code U ISRU
Curreri, Peter A.; Sibille, Laurent; [2004]; 1 pp.; In English; Space Technology and Applications International Forum, 8-11 Feb. 2004, Albuquerque, NM, USA; No Copyright; Avail: Other Sources; Abstract Only

The NASA microgravity research program, simply put, has the goal of doing science (which is essentially finding out something previously unknown about nature) utilizing the unique long-term microgravity environment in Earth orbit. Since 1997 Code U has in addition funded scientific basic research that enables safe and economical capabilities to enable humans to live, work and do science beyond Earth orbit. This research has been integrated with the larger NASA missions (Code M and S). These new exploration research focus areas include Radiation Shielding Materials, Macromolecular Research on Bone

and Muscle Loss, In Space Fabrication and Repair, and Low Gravity ISRU. The latter two focus on enabling materials processing in space for use in space. The goal of this program is to provide scientific and technical research resulting in proof-of-concept experiments feeding into the larger NASA program to provide humans in space with an energy rich, resource rich, self sustaining infrastructure at the earliest possible time and with minimum risk, launch mass and program cost. President Bush's Exploration Vision (1/14/04) gives a new urgency for the development of ISRU concepts into the exploration architecture. This will require an accelerated One NASA approach utilizing NASA's partners in academia, and industry.
Author
Microgravity; NASA Programs; Materials Science; Research and Development

31
ENGINEERING (GENERAL)

Includes general research topics related to engineering and applied physics, and particular areas of vacuum technology, industrial engineering, cryogenics, and fire prevention. For specific topics in engineering see *categories 32 through 39*.

20040047018 Ljubljana Univ., Ljubljana, Slovenia
Electrotechnical Review, Volume 70, No. 1-2
Zajc, Baldomir, Editor; Solina, Franc, Editor; Bajd, Tadej; Brglez, Franc; Divjak, Sasa; Furlan, Joze; Gubina, Ferdo; Jezernik, Karel; Matko, Drago; Pernus, Franjo, et al.; 2003; ISSN 0013-5852; 86 pp.; In English; In Slovene; See also 20040047019 - 20040047026; Copyright; Avail: Other Sources

Contents include the following: Computer-aided program for congestion management. New approach to the calculation of the general active and reactive power shares in line power flows. Skin effect impact on current density distribution in OPGW cables. Minimal risk based optimization of safety equipment testing and maintenance scheduling. Case study of the use of an integrated tool in process control. Procedure for estimation of error-rate of classification algorithms. An algorithm for the asymmetric traveling salesman problem. Latched recurring neural network. Satellite channel prioretization techniques in integrated satellite/terrestrial mobile networks. Lattice based coding schemes. Context dependent digital shape coding. Video object shape coding using control point optimization. Safeguarding moving persons and vehicles.
CASI
Algorithms; Asymmetry; Computer Techniques; Density Distribution; Error Analysis; Satellite Networks

20040050669 Massachusetts Inst. of Tech., Cambridge, MA
Multi-Vehicle Experimental Platform for Distributed Coordination and Control
How, Jonathan P.; Feb. 29, 2004; 12 pp.; In English
Contract(s)/Grant(s): F49620-02-1-0216
Report No.(s): AD-A420937; No Copyright; Avail: CASI; A03, Hardcopy

This report discusses the two testbeds that were developed with the DURIP grant, showing that all of the objectives were met and that they provide excellent facilities for demonstrating advanced coordination and control concepts in real-time, in realistic environments. Performing experiments on these testbeds will highlight the fundamental challenges associated with: (i) planning for large team in real-time; (ii) developing controllers that are robust to uncertainty in the situational awareness, and are sufficiently flexible to respond to dynamic changes; and (iii) using communication networks and distributed processing to develop integrated and cooperative plans. The testheds have been used to support several research and educational projects at MIT: 1. AFOSR Cooperative Control Theme 2. DARPA Mixed-Initiative Control of Automa-teams (MICA) 3. DARPA Software Enabled Control (SEC) 4. MIT Senior Capstone design class (16.821 Flight Vehicle Development) Proposals have been submitted to the DoD ACO and DARPA HURT ro rams that will use the testbeds.
DTIC
Active Control; Coordination; Distributed Parameter Systems

32
COMMUNICATIONS AND RADAR

Includes radar; radio, wire, and optical communications; land and global communications; communications theory. For related information see also 04 Aircraft Communications and Navigation; and *17 Space Communications, Spacecraft Communications, Command and Tracking*; for search and rescue, see *03 Air Transportation and Safety*; and *16 Space Transportation and Safety*.

20040046985 Swedish Defence Research Establishment, Linkoeping, Sweden
Platforms in Networks: Software Architecture and Operator Services
Berg, T.; Lantz, F.; Stroemberg, D.; 2003; In English
Report No.(s): PB2004-102237; FOI-R-0696-SE; No Copyright; Avail: National Technical Information Service (NTIS)

The report has two messages: (1) Network solutions require special software methodology, and (2) Successful information management in platform networks requires open systems solutions plus simple basic principles and flexible building stones. High quality software architecture is a fundamental requirement for cooperation tools to be used by operators in mobile platforms in defense applications. Forms and content for such architecture are discussed. The goal is to identify methods and services that support operators in platforms of different kinds aiming to cooperate in common tasks. Examples of such services are given. The proposed architecture is concretized with a self-developed tool for platform based data fusion and sensor management. A data fusion node coordinates these processes. Competing sensor tasks that ask for the same resources are generated by operators and platform based sub-systems concurrently. Multi agent technology is used to model these tasks. A framework for network oriented software is fundamental for external communication.
NTIS
Software Engineering; Computer Programs

20040046991 Swedish Defence Research Establishment, Linkoeping, Sweden
Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach
Linder, S.; Rantakokko, J.; Dec. 2002; In English
Report No.(s): PB2004-102230; FOI-R-0699-SE; No Copyright; Avail: National Technical Information Service (NTIS)

The problem to determine the impact on digital communication systems of electromagnetic interference often requires complex calculations and analyses. Therefore, there is a need for approximate methods suitable for computer-based tools for intersystem interference analyses. A commonly used approximation is to treat the interference as if it is additive white Gaussian noise (AWGN) when estimating the resulting big-error probability (BEP) for the digital communication system. However, the validity of the approximation varies for different types of interference. In this report, we show that it is possible to use higher-order statistics (HOS) as a quality measure of the AWGN-approximation. Furthermore, we also show that HOS can be used to quantify the impact on a digital communication receiver of some electromagnetic interference signals of interest. The results open up the possibility to use HOS as a quality measure of the resulting BEP when using approximate methods in computer-based tools.
NTIS
Electromagnetic Interference; Pulse Communication; Statistical Analysis

20040046993 Swedish Defence Research Establishment, Linkoeping, Sweden
Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks
Dyberg, K.; Farman, L.; Mar. 2002; In English
Report No.(s): PB2004-102235; FOI-R-0444-SE; No Copyright; Avail: National Technical Information Service (NTIS)

In modern military operations the requirements of transmitting large amounts of information have increased substantially during the last decade. This increases the demand for high-capacity radio networks. It is also essential that military decisions be made on recent and correct information, which requires that the delays are known and low. Other requirements are that the performance of the military radio network must be satisfactory in highly mobile scenarios and that the network must be robust against hostile jamming and other interfering sources. We have investigated how the capacity and average delay can be improved in an Ad Hoc network with Spatial reuse Time Division Multiple Access (STDMA) by using antenna arrays. The study is based on different antenna combinations consisting of single isotropic antenna element, beam steering and adaptive beam forming. We have also studied how the number of antenna elements and the terrain affects the performance.
NTIS
Antenna Arrays; Military Operations; Antenna Components

20040047001 Technische Univ., Delft, Netherlands
Quality Assessment of Satellite-Based Global Gravity Field Models
Bouman, J.; Jun. 19, 2000; In English
Report No.(s): PB2004-102196; Copyright; Avail: National Technical Information Service (NTIS)

A global model of the Earth's gravity field may be derived from satellite observations such as satellite tracking observations or satellite gravity gradiiometry (SGG). Due to the satellite's altitude above the Earth surface, the gravity field recovery from satellite data is an ill-posed problem since it lacks stability. In addition, the spatial data distribution is heterogeneous in general. A physically sensible solution may therefore only be obtained by imposing constraints on the solution or by using additional surface data. The former is called regularization. The regularization methods used here are all filtered least-squares solutions. Several methods are discussed as well as how to choose the filter or regularization parameter. Regularization yields stable solutions at the expense of introducing bias into the solution. The more the least-squares solution is filtered, the more stable the solution is and the more bias in introduced. The solution error is described by the mean square error matrix (MSEM) which includes propagated data noise and bias as well. The optimal choice for the regularization parameter will minimize the trace of the MSEM, the so-called mean square error.
NTIS
Satellite Tracking; Spatial Distribution; Earth Gravitation

20040047007 National Defence Research Establishment, Linkoeping, Sweden
Communication Channel in Urban Operations: A First Survey
Waern, A.; Johansson, P.; Lundborg, B.; Loefsved, E.; Sakari, P.; Jun. 2003; In English
Report No.(s): PB2004-102189; FOI-R-0884-SE; Copyright; Avail: National Technical Information Service (NTIS)

Military operations in urban environment are in general conducted with dismounted solders, both outside and inside buildings, including below ground in basements and culverts. Situation awareness is essential, position and status of team members are very important information for every solder. Communications is therefore essential for command and control, and wireless is the only means where radio is the prime technology. Free space optics (FSO) may be an alternative to radio communication in urban areas, due to less jamming and interception sensitivity, high by bit rate and no licensing or frequency allocation needed. However, the atmospheric effects, i.e., turbulence and attenuation, limit the availability of free space optics links. Even the radio channel sets limits for present and future wireless communication system. A thorough understanding of wave propagation is important and when calculating the wave propagation a number of propagation mechanisms need to be accounted for, i.e., transmission loss, arrival times, phases, delay spread and correlation bandwidth.
NTIS
Cities; Atmospheric Effects; Command and Control; Military Operations; Wireless Communication

20040047027 Newcastle-upon-Tyne Univ., Newcastle
Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises
Cook, N.; Shrivastava, S.; Wheater, S.; Aug. 2003; 22 pp.; In English
Report No.(s): PB2004-104259; CS-TR-814; Copyright; Avail: National Technical Information Service (NTIS)

Enterprises increasingly use the Internet to offer their own services and to utilize the services of others. An extension of this trend is Internet-based collaboration between enterprises to form virtual enterprises for the delivery of goods or services. Effective formation of a virtual enterprise will require information sharing across organizational boundaries. Despite the requirement to share information, the autonomy and privacy requirements of enterprises must not be compromised. This demands strict policing of inter-enterprise interactions, including non-repudiable access to shared information. For a member of a virtual enterprise, a typical requirement is the ability to inspect/modify shared information together with member-specific private information within a single ACID transaction. At the same time, inspection/modication of the shared information should both generate non-repudiation evidence and be consistent with policies agreed by the enterprises. The paper describes how information sharing middleware can be enhanced with distributed transaction support to perform regulated, transactional information sharing. Design and implementation of a prototype Java middleware is presented.
NTIS
Information Transfer; Computer Programming; Software Engineering

20040047037 Pennsylvania State Univ., University Park, PA, USA
Assessing Regression to the Mean and Intervention Effect
Lin, H. M.; 2003; 18 pp.; In English
Report No.(s): PB2004-103322; No Copyright; Avail: CASI; A03, Hardcopy

The authors conducted research to study the implications of and provide statistical solutions to regression effects when assessing the effectiveness of an intervention. The authors developed methods to estimate the intervention effect and adjust for the regression effect in a nonrandomized study with a mismeasured binary response and a binary response outcome. The extended the proposed methods to estimate the placebo and intervention effects in placebo-controlled studies and conducted a number of simulation studies to mimic actual medical situations. The authors quantified regression effect in various probable clinical scenarios, and proposed statistical methods to remove bias. The authors developed a statistical model for estimating the treatment effect where the selection variable is continuous and the outcome is binary, but were unable to obtain a converged estimation of treatment effect. The authors proposed four possible types of validation studied to be applied to single-armed, non-controlled studies. Finally, the authors analyzed restenosis and otitis media data for illustration. The proposed research is innovative and significant because current methods for adjustment for RTM have focused on normally distributed data, and are no longer adequate to cope with the complexities of health services outcomes and clinical studies in the real world.
NTIS
Statistical Analysis; Mathematical Models

20040047043 Helsinki Univ. of Technology, Espoo, Finland
Delay Estimation in Long-Code Asynchronous DS/CDMA Systems Using Multiple Antennas
Sirbu, M.; Koivunen, V.; 2003; 32 pp.; In English
Report No.(s): PB2004-102806; Copyright; Avail: National Technical Information Service (NTIS)

This paper addresses the problem of propagation delay estimation in asynchronous long-code DS/CDMA multi-user systems. Almost all the methods proposed so far in the literature for propagation delay estimation are derived for short codes and the knowledge of the codes is exploited by the estimators. In long-code CDMA, the spreading code is aperiodic and the methods developed for short codes may not be used or may increase the complexity significantly. For example, in the subspace based estimators, the aperiodic nature of the code may require subspace tracking. We propose a method for joint channel and delay estimation in uplink DS/CDMA using multiple antennas.
NTIS
Antennas; Code Division Multiple Access

20040047080 Swedish Defence Research Establishment, Stockholm, Sweden
The Information Flow in Network Based Defense
Falk, L.; 2003; 40 pp.; In English
Report No.(s): PB2004-102684; FOI-R-0658-SE; No Copyright; Avail: CASI; A03, Hardcopy

In order to clarify the concept of information warfare the flow of information is studied in network centric defense systems. Several systems are suggested as suitable objects for further investigation in terms of information flow. This view is pedagogically useful and tends to simplify discussions about future sensors systems by introducing information flow as a common concept. The amount of available information is a convenient measure of performance if comparisons are based on the principle that optimal decisions require that all available information is considered. This rule can be proved within the context of Bayesiansk statistics and is illustrated by practical examples concerning the performance of radar systems. The conclusion is that the ideas of information flow are best tested on existing sensor networks, e.g. STRIL, in order to study how information flow measures the function. The goal is to describe the effect of jamming in quantitative terms and investigate the effect of bottle necks on information flow.
NTIS
Information Flow; Electronic Warfare

20040047093 Helsinki Univ. of Technology, Espoo, Finland
Load Balancing by MPLS in Differentiated Services Networks
Susitaival, R.; Sep. 2002; 86 pp.; In English
Report No.(s): PB2004-104412; Copyright; Avail: National Technical Information Service (NTIS)

In IP routing, forwarding decisions are made independently in each router. Multi Protocol Label Switching (MPLS) as a new technique assigns a short label to each packet at the ingress node of MPLS network and packets are forwarded according to these labels. The most significant application of MPLS is the Traffic Engineering, which is used to optimize the performance of networks. The capability of MPLS of explicit routing as well as of splitting of the traffic on several paths allows load balancing. The goal of this thesis is to study a flow allocation that minimizes the mean delay of the network. The thesis concentrates on the minimum-delay algorithm presented by Gallager and its two approximations. The first approximation

defines the paths using the LP-optimization and after that allocates traffic using the NLP-optimization. The second approximation divides traffic into parts and routes them consecutively using Dijkstra's algorithm. Using the load balancing algorithms as a starting point, the main goal of this thesis is to develop optimization algorithms that differentiate classes in terms of mean delay. In the thesis, the differentiation is achieved by the use of both routing and WFQ-scheduling. Both optimal and approximative algorithms are developed for the joint optimization of the WFQ-weights and routing. The load balancing algorithms and the algorithms to differentiate classes are implemented and tested. As a result it is found that the use of the approximations simplifies the optimization problem but still provides results that are near to optimal. The algorithms that try to differentiate traffic classes by both routing and WFQ-scheduling provide the best performance.
NTIS
Switching; Communication Networks; Protocol (Computers); Scheduling

20040047094 Helsinki Univ. of Technology, Otaniemi, Finland
First International Mobile IPR Workshop. Rights Management of Information Products on the Mobile Internet held August 27-28, 2003, Helsinki, Finland
2003; 156 pp.; In English
Report No.(s): PB2004-104405; MOBILEIPR-2003; Copyright; Avail: National Technical Information Service (NTIS)

Shifting from Risk regulation to Risks produced by regulation, this study attempts to explore the emergence and operation of regulatory Ecologies as an organic approach for dealing with the issue of Risk and regulation. Objective of this paper is to investigate the reasons behind regulatory failure and set a research agenda for dealing with the issue of technology regulation, in a two-step approach. The first step is of a methodological nature: it calls for the adoption of an alternative stance for studying the regulatory phenomenon by viewing the content of regulation as a direct result of its creation process and focusing on the latter at least as much as on the former. The next step is to re-conceptualize regulation not as a means for controlling and delimiting contingencies but as an instrument for their proliferation. The Open Source development of the Gnutella protocol is illustrated as such an alternative regulatory paradigm and contrasted to a model of regulation based on control of contingencies such as that of Trusted Computing Platform or Technical Measures of protection.
NTIS
Regulations; Internets; Conferences

20040047125 Drexel Univ., Philadelphia, PA, USA
Microwave Photonics in Dual-Use Military Systems: A Personal Perspective
Daryoush, Afshin S.; Optics Microwave Interactions; April 2003, pp. 1-1 - 1-17; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

Microwave photonics has come of age and there are a number of military applications that could directly benefit from. Optically controlled phased array antenna is one of the most widely pursued applications. The fiberoptic links are employed for distribution of a variety of communication, intelligence, tracking, radar signals. There are a number of issues that dictate the type of architecture that is employed for effective and reliable control of phased array. However, the most important benefit is in the optical signal processing of microwave signals. Fiber delay lines are an important element of an signal processing solutions.
Author
Microwave Equipment; Photonics; Military Technology

20040047126 Raytheon Electronic Systems, El Segundo, CA, USA
Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems
Lee, J. J.; Optics Microwave Interactions; April 2003, pp. 3-1 - 3-3; In English; See also 20040047121; Copyright; Avail: CASI; A01, Hardcopy

This paper was prepared for NATO's RTA Lecture Series No. 229 presented at the workshop of Optics-Microwave Interactions held in September 2002. This lecture reviews recent developments of fiber-fed radio systems, an emerging technology using fiber optic networks to distribute broad band RF and MMW signals for mobile and wireless systems over long distance and within small cells. What is 'Fiber Radio?' Fiber Radio is a fiber-fed radio system using fiber optic links or networks to distribute video, voice, and data for mobile and wireless applications. Antenna remoting is an example where MMW subcarriers at 18, 24, 38, or 60 GHz with information are transmitted from central office to base stations. This emerging technology has been demonstrated for applications such as community communications and pico-cell wireless systems for both uplinks and downlinks broadcast carrying CATV, WLAN signals and data ranging from 2 to 156 Mbps. According to a

McKinsey report, August 2001, the market trend for this industry is hard to predict at this point. In general, the telecom markets have slumped for the last few years. The slowdown was caused by over-capacity and unrealistic forecast. Numerous start-ups were funded five years ago, but many stocks dropped by 80 percent or more in value since then. Many US companies have suffered great losses. However, the demand for broad band services is for sure increasing. It is estimated that the growth rate may reach 25 percent a year. Thus the over-capacity or glut may be absorbed in a few years. It can be safely remarked that the 'fiber-radio' technology is attractive, but it is not a huge mature market yet.
Author
Wireless Communication; Optical Communication; Radio Equipment; Communication Networks

20040047130 Budapest Univ. of Technology and Economics, Budapest, Hungary
Opto-Microwave Signal Processing: Up and Down Conversion Techniques
Berceli, Tibor; Csornyei, Mark; Optics Microwave Interactions; April 2003, pp. 6-1 - 6-17; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

This application note introduces the concepts of opto-microwave signal processing used in several communication systems today. Emphasis is placed on optical-microwave up- and down conversion techniques. In today's and future mobile- or local area networks (LAN) there is a need for optically supported network technologies with a few sophisticated central stations serving a big number of quite simple and cheap optical terminals, such as small base-stations in millimeter-wave optical-wireless local multipoint distribution systems (LMDS), computer or CATV networks. The right answer for all of these challenges is the subcarrier modulated optical transmission. The subcarrier optical data transmission method offers several advantages over the generally applied TDMA (time division multiple access) system. In a TDMA system the transmitters of the stations are operated on a time sharing basis. In the receivers direct optical detection is used. In a high bit rate data communications network a digital signal processing system with complete capacity should be applied both in the transmitters and in the receivers. That is a big disadvantage which limits the future enhancement of the network capacity. In case of the subcarrier type optical data communications the transmission capacity of the network can be increased by applying new subcarriers, and thus the digital signal processing system can be kept with unchanged bit rate. The transmitters are used in a continuous operation and in the receivers a heterodyne type detection can be applied which provides a lower noise figure. The continuous operation of the transmitters makes possible several connections working at the same time. The present method used for reception is rather complex and therefore somewhat troublesome because it applies a tuned filter. Utilizing an opto-microwave mixer there is no need for a tuned filter and thus it is suitable for monolithic integration.
Author
Optical Communication; Microwaves; Signal Processing

20040047131 Drexel Univ., Philadelphia, PA, USA
Fiber Optic Distribution Networks for Military Applications
Daryoush, Afshin S.; Optics Microwave Interactions; April 2003, pp. 7-1 - 7-16; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

A number of military applications require ad-hoc wireless communication and networking systems that employ low phase noise reference signals for up- and down-conversion of communication signals and further processing of data signals. High performance fiber optic links are important for distribution of signals while phase noise degradation induced by AM-PM conversion in fiberoptic links impacts phase coherency of local oscillator (LO) signals in distributed systems. This paper focuses on issues associated with directly and externally modulated fiber optic links and their performance limitations in terms of gain, noise figure, nonlinearity, and dynamic range. The performance-cost aspects of both types of links are compared and it is pointed out that directly modulated links meet performance-cost requirements in most applications. Analysis of phase noise degradation of frequency reference is presented for directly modulated fiber optic distribution networks. SRS induced fiber nonlinearity is also discussed. Since the response of a Fabry-Perot laser diode can be altered by adding an external feedback, resulting in a resonance peak, results of a monolithically integrated FP laser are discussed. Finally, opto-electronic mixing of IF and LO signals are also demonstrated for the mode-locked case.
Author
Communication Networks; Fiber Optics; Optical Communication

20040047132 Thales Airborne Systems, Elancourt, France
Optical Beamforming Networks for Radars and Electronic Warfare Applications
Chazelas, Jean; Dolfi, Daniel; Tonda-Goldstein, Sylvie; Huignard, Jean-Pierre; Optics Microwave Interactions; April 2003, pp. 9-1 - 9-14; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

Future microwave systems will be generally based on active electronic antennas. This evolution is determined by requirements of improved performances of these equipments in terms of reliability, jamming resistance, flexibility for the beamforming in the transmit and in the receive mode. Such antennas will be use in a large number of applications such as radar, communication and electronic warfare. In order to satisfy this multifunctional aspects, it will be necessary to distribute these antennas on ground based areas as well as the aircraft surface. Multistatic systems will impose multiple remoting of antennas with respect to their processing units. In all cases, it appears a need for low loss link able to remote the control of the antennas as well as distribution and processing of very wideband microwave signals (typ. 1-20 GHz). Maturity and performances (in terms of spectral purity or phase noise, dynamic range linearity) of optoelectronic components permit to envisage the optical transmission and the optical processing of these signals. Today, the optical transmission of microwave signals offers in conjunction with their low loss propagation over very wide frequency bandwidth, a high immunity to electromagnetic perturbations, which opens new avenues for the insertion of new concepts and photonic architectures in microwave systems. Photonics and microwave technologies offers new opportunities for controlling many thousand array elements together with handling the wide bandwidth of shared aperture antennas. Photonics technologies will provide an interconnect solution for future airborne phased array radar antennas, which have conformality, bandwidth, EMI immunity, size, and weight requirements increasingly difficult, if not impossible, to meet using conventional electrical interconnect methods.
Derived from text
Communication Networks; Optical Communication; Beamforming; Microwave Equipment

20040050179 Congressional Research Service, Washington, DC, USA
USA Patriot Act Sunset: Provisions that Expire on December 31, 2005
Doyle, C.; Jan. 2004; 26 pp.; In English
Report No.(s): PB2004-104823; RS-32186; No Copyright; Avail: CASI; A03, Hardcopy

Several sections of Title 2 of the USA PATRIOT Act (the Act) relating to enhanced foreign intelligence and law enforcement surveillance authority expire on December 31, 2005. Thereafter, the authority remains in effect only as it relates to foreign intelligence investigations begun before sunset or to offenses or potential offense begun or occurring before that date. There may be some disagreement of whether a potential offense is a suspected crime, an incomplete crime, or both.
NTIS
Law (Jurisprudence); Intelligence

20040050317 National Inst. for Occupational Safety and Health, Pittsburgh, PA, USA
Emergency Communication Triangle
Mallett, L.; Vaught, C.; Brnich, M. J.; Oct. 1999; 22 pp.; In English
Report No.(s): PB2004-104350; No Copyright; Avail: CASI; A03, Hardcopy

This training material focuses on the content of emergency warning messages. Research has shown that when an emergency occurs, people often do not get the information they need for the purpose of taking appropriate action. This safety talk presents a procedure, using mental cues that can be used by senders and receivers of emergency warnings. This material has been developed for use in short safety-training sessions such as start-of-shift safety or toolbox talks. The information can be presented in approximately fifteen minutes and is appropriate for workers at all experience levels. While the examples and illustrations are taken from the underground coal mining industry, the training can be tailored to any work setting by substituting appropriate examples.
NTIS
Emergencies; Communication

20040050767 Army Research Inst., Orlando, FL
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation
Durlach, Paula J.; Bowens, Laticla D.; Neumann, John L.; Carnahan, Thomas J.; Jan. 2004; 65 pp.; In English
Contract(s)/Grant(s): Proj-A790
Report No.(s): AD-A421089; ARI-TR-1141; No Copyright; Avail: CASI; A04, Hardcopy

As the U.S. Army undergoes transformation, it will need reliable means of measuring and training complex new skills. Acquiring those will require analysis of human behavior in the context of human-in-the-loop simulations of Future Combat Systems (FCS) still in the concept exploration phase. The goal of the present effort was to establish and measure command group behavior observed in such a human-in-the- loop simulation via analysis of the verbal interactions of the command

group. A coding scheme for command group verbal interactions was devised and applied to several simulation runs in which a command group of 4 experienced Army Lt. Col.'s controlled an array of simulated unmanned air and ground platforms to accomplish a deliberate attack mission. This report documents the development of the coding scheme, the analysis results, and considers various other approaches for analyzing verbal data.
DTIC
Armed Forces (United States); Coding; Combat; Command and Control; Control Simulation; Prototypes; Verbal Communication

20040050791 Johns Hopkins Univ., Baltimore, MD
Innovation on a Hospital Perinatal Unit: Cell Phone Use by Nurses
Petrilak, Thomas J.; Apr. 2002; 79 pp.; In English
Report No.(s): AD-A421122; No Copyright; Avail: CASI; A05, Hardcopy

The nursing shortage in the USA has a direct impact on all aspects of health care throughout the nation. Consequences of this shortage affect cost, job satisfaction, turnover rate, recruitment effort, and ultimately the quality of care provided to the patient. Many initiatives are underway to confront this shortage. One area of focus is the reduction of nurse times pent performing functions that could be accomplished by hospital support staff. This study evaluates the impact and effect of cell phone communication technology on reducing nurse task frequency and time spent on activities that could more appropriately be accomplished by hospital support staff. The study evaluates the cost benefit of cell phone deployment and its impact on nurse task frequency and satisfaction.
DTIC
Hospitals; Medical Personnel

20040050809 Army Medical Research Inst. of Chemical Defense, Aberdeen Proving Ground, MD
Telechemistry Projecting Laboratory Expertise to a Deployed TAML
Slife, Harry; Jun. 2003; 6 pp.; In English
Contract(s)/Grant(s): MIPR-3GD3E33087
Report No.(s): AD-A421144; No Copyright; Avail: CASI; A02, Hardcopy

Significant progress has been made on the Telemedicine initiative entitled Telechemistry - Projecting Laboratory Expertise to a Deployed TAML'. All equipment identified in the proposal has been purchased. All contracts have been let and the execution of the proposal budget is on track. However, The project is suffering from a series of events that have delayed the delivery and training on the equipment These will be discussed in detail in the Problems area of the report. The delay has put the project 2 months behind schedule. Therefore no testing of the proposed system has been conducted. A review of the proposed schedule has identified areas where we can make up the time lost. This will be addressed in the 2nd half project life cycle portion of the report. The equipment on hand has been tested and operates as expected. Once a delivery and training schedule has been coordinated with the user it is expected that the protocol will be completed in relatively short order. A comprehensive Microsoft Project file has been filed separately providing in depth information on the status of the project, resource and schedule-wise. No performance data is yet available.
DTIC
Deployment; Telemedicine

33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes development, performance, and maintainability of electrical/electronic devices and components; related test equipment; and microelectronics and integrated circuitry. for related information see also *60 Computer Operations and Hardware*; and *76 Solid-State Physics*. For communications equipment and devices see *32 Communications and Radar*.

20040045313 Nippon Telegraph and Telephone Public Corp., Japan
NTT Technical Review, Volume 2, No. 3
March 2004; ISSN 1348-3447; 88 pp.; In English; Copyright; Avail: Other Sources

Contents include the following: Laboratory Group Strategies. Broadband and our Network Style. Laboratory Strategies. Our Vision of Human Interface Research. R&D Spirits. Empirical Research and Development Using an Ultrahigh-speed Experimental Network. Development of Terabit Super-network Technologies. Conceptual Design for a Terabit-class Super-networking Architecture.IP-in-IPv6 Overlay Networking Technology for a Terabit-class Super-network. Cut-through

Optical Path Control Technology for a Terabit-class Super-network. Cut-through IP Forwarding Technology for a Terabit-class Super-network. Speech and Audio Signal Processing Technologies. Speech and Audio Signal Processing for a User-friendly, Comfortable, Convenient Telecommunication Environment. Scalable Speech Coding Technology for High-Quality Ubiquitous Communications. Echo Canceller with Noise Reduction Provides Comfortable Hands-free Telecommunication in Noisy Environments.Cyber Attendant System with Spontaneous Speech Interface. Text-to-Speech Synthesis Technology Using Corpus-Based Approach. Field Test Results for a 250-kW-Class Polymer Electrolyte Fuel Cell Cogeneration System. Global Standardization Activities. Standardization of Speech Quality Assessment of IP Telephony.
CASI
Auditory Signals; Electrolytic Cells; Field Tests; Noise Reduction; Sound Waves; Telecommunication; Voice Data Processing

20040045356 Computer Sciences Corp., Moffett Field, CA, USA
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors
Anantram, M. P.; Svizhenko, Alexei; Govindan, T. R.; Govindan, T. R.; Walch, S.; Mehrez, H.; November 05, 2003; 6 pp.; In English; Seminars at Indian Institute of Technology, 5-6 Jan. 2004, Chennai, India
Contract(s)/Grant(s): NAS2-14303; RTOP 519-40-12; No Copyright; Avail: CASI; A02, Hardcopy

The topics covered by the panels of this viewgraph presentation include phonon scattering, layered structures, DNA as a device, the influence of twist and rise in the DNA molecule, counter-ions, conductance versus length, and intrinsic resonant tunneling.
CASI
Nanostructures (Devices); Molecular Electronics; Deoxyribonucleic Acid

20040046989 Lawrence Livermore National Lab., Livermore, CA
Nanosecond Frame Cameras
Frank, A. M.; Wilkins, P. R.; Jan. 05, 2001; 14 pp.; In English
Report No.(s): DE2004-15005757; UCRL-JC-136956; No Copyright; Avail: Department of Energy Information Bridge

The advent of CCD cameras and computerized data recording has spurred the development of several new cameras and techniques for recording nanosecond images. We have made a side by side comparison of three nanosecond frame cameras, examining them for both performance and operational characteristics. The cameras include; Micro-Channel Plate/CCD, Image Diode/CCD and Image Diode/Film; combinations of gating/data recording. The advantages and disadvantages of each device will be discussed.
NTIS
Cameras; Microchannels

20040046990 Swedish Defence Research Establishment, Tumba
High Voltage Generation Research with the TTHPM System at FOI
Nyholm, S. E.; Applegren, P.; Bjarnholt, G.; Hultman, T.; Larsson, A.; Dec. 2002; In English
Report No.(s): PB2004-102212; FOI-R-0674-SE; No Copyright; Avail: National Technical Information Service (NTIS)

The purpose of High Power Microwave (HPM) weapons is to generate one or several high amplitude microwave pulses, with the ability to disturb or destroy electronic equipment. Used on the electronic battlefield this can have severe impact on today's C4I-systems (command, control, communications, computers and intelligence), e. g. in the network based defense (NBD). The purpose of a power conditioning system is to adapt and transform the pulse obtained from the primary energy source to the requirements of the microwave source used. This usually means transforming a high current to a high voltage and shortening the rise time of the pulse. This is accomplished in the TTHPM system using an intermediate storage inductor, an electrically exploded wire fuse opening switch and a spark gap closing switch. The research on the TTHPM system is financed by the Swedish Armed Forces. This report summarizes the work with the TTHPM system and lessons learned during the last three years. Important conclusions are listed and the suitability for integration into an HPM warhead is discussed.
NTIS
High Voltages; Microwaves; Intelligence

20040046992 Swedish Defence Research Establishment, Linkoeping
Investigation of the Electromagnetic Field Distribution in an Undermoded Reverberation Chamber
Brostroem, E.; Mar. 2003; In English
Report No.(s): PB2004-102232; FOI-R-0823-SE; No Copyright; Avail: National Technical Information Service (NTIS)

Electromagnetic radiation with high intensity can cause disturbance and destruction of electronic systems. The electromagnetic threat can be intentional, e.g. High Power Microwave (HPM) weapons, or unintentional, e.g. radiation from radar stations. A Reverberation Chamber (RC) is a test facility that can be used to perform susceptibility tests of electronic systems. The properties of the electromagnetic field in the chamber have to be well known to be able to use the RC. A deterministic model of the field would be very complex, and therefore field statistics are used to describe the field. Normally the RC is used for applications at high frequencies, where the chamber is over-moded, but low frequency measurements are also of great practical and economical interest. For high frequencies it exists a commonly accepted statistical model for the field in the chamber, the X (chi) distribution.
NTIS
Electromagnetic Fields; Reverberation; Test Chambers

20040047003 Swedish Defence Research Establishment, Linkoeping
Comparison between High Level Radiated Susceptibility Tests and Coupling Measurements
Hoeijer, M.; Sep. 2002; In English
Report No.(s): PB2004-102234; FOI-R-0562-SE; No Copyright; Avail: National Technical Information Service (NTIS)
It is well known that High Power Microwaves (HPM) can disturb, and even destroy modern electronics. In the recent years, FOI and others have shown that the sensitivity of electronic equipment shows a substantial dependence on the irradiation direction of the object. These results stem from low level coupling measurements. The reason for doing a coupling measurement rather than a high level Radiated Susceptibility test (RS-test) is that much lower field intensities can be used and is therefore much easier to perform. However, the goal is to do a RS-test, and we have therefore performed a high-level RS-test and compared the results to the results of coupling measurements. As test object we have used a generic missile (GENEC), which has been irradiated from many directions in one plane. The RS-test was performed by monitoring at which field strength a digital electronic inside GENEC failed to work properly. This report shows that the apparent directivity differs in details between the RS-tests and the coupling measurements, but typical lobe widths and the maximum apparent directivity are almost identical.
NTIS
Electronic Equipment; Missiles

20040047019 Electro Slovenia, Maribor, Slovenia
Skin Effect Impact on Current Density Distibution in OPGW Cables
Zunec, Miro; Jakl, Franc; Ticar, Igor; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 17-21; In English; See also 20040047018; Copyright; Avail: Other Sources
An analytical approach is described to the issue of skin effect on current or current density distribution over the cross-section of the tube type conductors. Due to the skin effect, the curremt flows towards the conductor surface, the result being an uneven current distribution over the conductor cross-section.
Author
Power Lines; Current Distribution

20040047042 Helsinki Univ. of Technology, Espoo, Finland
AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics
Korhonen, T. M.; 2001; 150 pp.; In English
Report No.(s): PB2004-102891; HUT-EPT-5; Copyright; Avail: National Technical Information Service (NTIS)
As lead-free alternatives to PbSn-based solders are being sought, more information is needed about the properties of the different lead-free solders and about their interactions with conductor metals or metal finishes such as Cu, Ni, Ag, Au and recently Bi. Especially in fine-pitch applications such as flip chip, where solder volumes are small, it is important to control the intermetallic reactions that occur during soldering in order to ensure good reliability. In this work, solder-conductor reactions were investigated both experimentally and theoretically by employing thermodynamic modeling. The phase transformations occurring during soldering and the resulting solder microstructures were also studied. The electronics industry has selected solders based on the SnAg system as its preferred lead-free choice with ternary and multicomponent alloying elements to optimize the microstructure and mechanical properties. Therefore, emphasis was placed on studying the SnAg solder system, with Bi, In and Cu as major alloying elements, and its reactions with Cu, Ni, and CuNi alloys as conductor metals or metal finishes.
NTIS
Conductors; Mechanical Properties; Phase Transformations; Thermodynamics

20040047122 Thales Airborne Systems, Elancourt, France

Optical Processing of Microwave Signals, Part B

Chazelas, Jean; Dolfi, Daniel; Tonda-Goldstein, Sylvie; Huignard, Jean-Pierre; Optics Microwave Interactions; April 2003, pp. 5B-1 - 5B-12; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

The availability of optoelectronic components operating up to 20 GHz brings attractive perspectives for optical processing of microwave signals. Furthermore optically carried microwave signals can experience large time delays, especially in fiber based systems, providing time-frequency products in the range between 10(exp 2)-10(exp 3). Owing to their inherent parallel processing capabilities, optoelectronic architectures are well suited for the implementation in radar and electronic warfare systems of basic functions such as spectrum and time delay analysis, adaptive and programmable filtering, correlation and waveform generation. This document is prepared for the NATO's RTA Lecture Series 299 on Optics and Microwave Interactions to be presented in September 2002.

Author

Optoelectronic Devices; Microwave Equipment; Optical Communication; Signal Processing

20040047128 Universite des Sciences et Techniques de Lille Flandres Artois, Villeneuve D'Ascq, France

Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology

Decoster, D.; Dupont, S.; Magnin, V.; Optics Microwave Interactions; April 2003, pp. 1-1 - 1-20; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

Microwave optical links can be considered as basic bricks for some emerging system applications such as optically supplied microwave antennas... Emitters, optical switching matrices, high speed photodetectors and specific components for up or down conversion, are generic devices or functions for microwave optical links. We will describe main ways to generate microwave or millimetre wave signals through an optical fibre: direct and external modulation, optical control of microwave oscillators, generation of harmonics with laser non-linearities, dual mode emitters, with emphasis on new explored ways. Optical switching matrixes, which are basic photonic integrated circuits for optical processing are also examined, with recent cross-talk and phase noise results. The problem related to high speed photodetectors are also detailed with emphasis on waveguide photodetectors. The problem of up and down conversion is developed through specific optoelectronic devices. At last, we discuss the monolithic integration of optoelectronic or photonic devices, recalling that the industrial way is based on hybrid technology on silicon mother board, and we suggest new ways for the future.

Author

Optoelectronic Devices; Integrated Circuits; Microwave Equipment; Optical Fibers

20040047129 Gerhard-Mercator Univ., Duisburg, Germany

Optoelectronic Components and Integration Devices: From Concepts to Applications

Jaeger, D.; Stoehr, A.; Optics Microwave Interactions; April 2003, pp. 2-1 - 2-18; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

The field of optics-microwave interactions can generally be defined as the study of highspeed photonic devices operating at microwave, millimeterwave or even THz frequencies and their use in microwave or photonic systems. In this multidisciplinary field at the interface between microwave techniques, ultrafast electronics and photonic technologies, typical investigations include, for example, high-speed and microwave signal generation, processing and conversion as well as the distribution and transmission of microwave signals via broadband optical links. From pioneering experiments in the 70's, this field of microwave photonics has paved the way for an enabling novel technology with a number of innovative and commercially important applications. This paper is intended to give an overview on this multidisciplinary field of microwave and millimeterwave photonics addressing specifically high speed optoelectronic components and their integration technologies and giving a glance on a few key microwave applications. The first chapter gives as an introduction an overview on the field of microwave and millimeterwave photonics and its significance for different microwave techniques. The second chapter is devoted to the principles of microwave optical interaction devices starting with the basics of optically vertical and optical waveguide structures. Moreover, lumped elements as well as traveling wave devices are discussed furtheron. The photonic microwave component family includes photodetectors, laser diodes, modulators, mixers, etc. where different physical interactions can be employed. In particular, recent advances in electroabsorption (EA) devices such as electroabsorption modulators (EAM) and electroabsorption photodetectors (EAD) as well as EA transceivers (EAT) and photomixers (EAX) are discussed in chapter three together with the results from experiments. The fourth part addresses optoelectronic integration techniques such as monolithic integration of different functions but also fiber chip coupling techniques. It is followed by a few interesting examples of photonic microwave signal processing components and modules in chapter five. The sixth chapter is

particularly devoted to basic characteristics of microwave optical links and in the last chapter several examples of optical microwave system applications are presented.
Author
Photonics; Optoelectronic Devices; Microwave Equipment

20040050273 NASA Marshall Space Flight Center, Huntsville, AL, USA
Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions
Engberg, Robert; Ooi, Teng K.; March 2004; 9 pp.; In English; Society of Photo-Optical Instrumentation Engineers, 14-16 Mar. 2004, San Diego, CA, USA; No Copyright; Avail: CASI; A02, Hardcopy

New methods for structural health monitoring are being assessed, especially in high-performance, extreme environment, safety-critical applications. One such application is for composite cryogenic fuel tanks. The work presented here attempts to characterize and investigate the feasibility of using imbedded piezoelectric sensors to detect cracks and delaminations under cryogenic and ambient conditions. A variety of damage detection methods and different Sensors are employed in the different composite plate samples to aid in determining an optimal algorithm, sensor placement strategy, and type of imbedded sensor to use. Variations of frequency, impedance measurements, and pulse echoing techniques of the sensors are employed and compared. Statistical and analytic techniques are then used to determine which method is most desirable for a specific type of damage. These results are furthermore compared with previous work using externally mounted sensors. Results and optimized methods from this work can then be incorporated into a larger composite structure to validate and assess its structural health. This could prove to be important in the development and qualification of any 2' generation reusable launch vehicle using composites as a structural element.
Author
Piezoelectricity; Composite Structures; Cracks; Damage; Cryogenics; Impedance Measurement; Monitors

20040050388 Rensselaer Polytechnic Inst., Troy, NY, USA, Massachusetts Inst. of Tech., Lexington, MA, USA, Sarnoff Corp., Princeton, NJ, USA, Lockheed Martin Corp., Syracuse, NY, USA
Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications
Kumar, R. J.; Gutmann, R. J.; Borrego, J. M.; Dutta, P. S.; Wang, C. A.; 2003; 12 pp.; In English
Report No.(s): DE2004-821373; No Copyright; Avail: Department of Energy Information Bridge

Radio-frequency (RF) photoreflectance measurements and one-dimensional device simulations have been used to evaluate bulk recombination parameter and surface recombination velocity (SRV) in doubly-capped 0.55 eV, 2 x 10(sup 17) cm(sup -3) doped p-InGaAsSb epitaxial layers for thermophotovoltaic (TPV) applications. Bulk lifetimes of 90-100 ns and SRVs of 680 cm/s to 3200 cm/s (depending on the capping layer) are obtained, with higher doping and higher bandgap capping layers most effective in reducing SRV. RF photoreflectance measurements and one-dimensional device simulations are compatible with a radiative recombination coefficient (B) of 3 x 10(sup -11) cm(sup 3)/s and Auger coefficient (C) of 1 x 10(sup -28) cm(sup 6)/s.
NTIS
Epitaxy; Radio Frequencies; Simulation

20040050776
4TH International Conference on Antenna Theory and Techniques. Volume 1
Sep. 12, 2003; 420 pp.; In English
Contract(s)/Grant(s): FA8655-03-1-5060
Report No.(s): AD-A421100; EOARD-CSP-03-5060; No Copyright; Avail: CASI; A18, Hardcopy

The Final Proceedings for 2003 International Conference on Antenna Theory and Techniques (ICATT), 9 September 2003 - 12 September 2003. This is an interdisciplinary conference. Topics include: 1. General antenna theory; 2. Reflector, lens and hybrid antennas; 3. Antenna arrays; 4. Adaptive antennas, signal processing; 5. Broadband and multi frequency antennas; 6. Low-gain, printed antennas 7. Antennas for mobile communication; 8. Antennas for remote sensing; 9. Antenna measurements; 10. Analytical and numerical methods; 11. Microwave components and circuits fiber- optics links; 12. Industrial and medical applications of microwave technologies 13. Electromagnetic compatibility; 14. Antenna radomes and absorbers; 15. Electromagnetism at the high school
DTIC
Conferences; Electromagnetism

20040050790 Florida Univ., Gainesville, FL
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement
Kadirvel, K.; Taylor, R.; Horowitz, S.; Hunt, L.; Sheplak, M.; Jan. 2004; 11 pp.; In English
Contract(s)/Grant(s): DAAD19-00-1-0002
Report No.(s): AD-A421120; ARO-40422.3-MS; No Copyright; Avail: CASI; A03, Hardcopy

This paper presents the design and characterization of an intensity modulated optical lever microphone. Optical microphones (OM) have an inherent immunity to environments hostile to electronics due to the spatial separation of the electronics and the acoustic field under test. Theoretical equations for the sensitivity, minimum detectable signal, and frequency response are presented. Physical phenomena responsible for limiting the microphone minimum detectable signal (MDS) are identified, and a model is developed for use with a laser diode as the light source. The characterization of the microphone indicates an overall sensitivity of 0.5 mV/Pa, a linear response up to 132dB ref. 20 uPa, and an overall noise floor of 70dB measured at 1kHz over a 1Hz bin.
DTIC
Acoustic Measurement; Aeroacoustics; Microelectromechanical Systems; Microphones; Optical Measurement

20040050814 Academy of Sciences (USSR), Moscow
Microwave Chaotic Sources
Dmitriev, A.; Kssian, G.; Kuzmin, L.; Jul. 2003; 42 pp.; In English
Contract(s)/Grant(s): N62558-02-M-6374
Report No.(s): AD-A421152; No Copyright; Avail: CASI; A03, Hardcopy

The objective of the project was a search, analysis and selection of RF devices that have potential to be used to generate chaotic oscillations and that already have mathematical models that demonstrate low-dimensional chaotic behavior. The last property potentially enables to construct the symbolic description of chaotic trajectories. The performed search and analysis show that among potential candidates traveling-wave tube (TWT) and chaotic oscillator based on microtriode are more suitable for our purposes. Chosen models are investigated as for existence of low- dimensional chaotic modes. The possibility of symbolic' description of a trajectory, through construction of a quasi- one-dimensional map is studied for values of parameters corresponding to low-dimensional chaotic modes. It is shown how the symbolic description can be constructed, both for the model of TWT and for the model of chaotic oscillator based on microtriode.
DTIC
Chaos; Microwave Tubes; Radiation Sources

20040051026 National Chiao Tung Univ., Hsinchu, Taiwan, Province of China
Design and Implementation for the Prototype of a Microstimulator
Chiang, Cheng-Ta; Journal of the Chinese Institute of Engineers; May 2003; ISSN 0253-3839; Volume 26, No. 3, pp. 361-365; In English; Original contains black and white illustrations; Copyright; Avail: Other Sources

In this paper, the first domestic implementation of an implantable microstimulator utilizing HDL and ASIC methodologies is presented. We implement the digital part of the microstimulator by writing the hardware description language for the digital circuits, synthesizing them and downloading them into a field programmable gate array. The analog part is designed by using full-custom IC design flow, implemented by CMOS 0.35 pm technology, and fabricated by TSMC. It generates a maximum current of 2.77 mA through l kOMEGA load while the stimulation frequency is 20Hz and the stimulation current pulse width is 300 ps, and the maximum power consumption is evaluated at 14 mW based on a 5 V voltage supply.
Author
Neuromuscular Transmission; Stimulation; Implanted Electrodes (Biology); Fabrication; Prototypes; Microelectronics

34
FLUID MECHANICS AND THERMODYNAMICS

Includes fluid dynamics and kinematics and all forms of heat transfer; boundary layer flow; hydrodynamics; hydraulics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics*.

20040045292 NASA Ames Research Center, Moffett Field, CA, USA
Implementation of Finite Rate Chemistry Capability in OVERFLOW
Olsen, M. E.; Venkateswaran, S.; Prabhu, D. K.; [2004]; 8 pp.; In English; 34th AIAA Thermophysics Conference, 28 Jun. - 1 Jul. 2004, Portland, OR, USA; No Copyright; Avail: CASI; A02, Hardcopy

An implementation of both finite rate and equilibrium chemistry have been completed for the OVERFLOW code, a chimera capable, complex geometry flow code widely used to predict transonic flow fields. The implementation builds on the computational efficiency and geometric generality of the solver.
Author
Flow Distribution; Finite Difference Theory; Reacting Flow; Mathematical Models; Chemical Equilibrium

20040045293 NASA Ames Research Center, Moffett Field, CA, USA
High Order Filter Methods for Shock/Turbulence MHD Flows
Yee, H. C.; Sjoegreen, Bjoern; December 2003; 1 pp.; In English; International Conference on CFD, 12-16 Jul. 2004, Toronto, Canada; No Copyright; Avail: Other Sources; Abstract Only

Low-dissipative high order filter finite difference methods for shock/turbulence/combustion compressible viscous MHD flows has been constructed. Several variants of the filter approach that cater to different flow types are proposed. These filters provide a natural and efficient way for the minimization of the divergence of the magnetic field (del (raided dot) B) numerical error in the sense that no standard divergence cleaning is required. For certain 2-D MHD test problems, divergence free preservation of the magnetic fields of these filter schemes has been achieved.
Author
Magnetohydrodynamic Flow; Turbulent Flow; Filters; Dissipation; Shock

20040045343 Sierra Lobo, Inc., USA
Flexible Cryogenic Temperature and Liquid-Level Probes
Haberbusch, Mark; December 10, 2003; 3 pp.; In English
Contract(s)/Grant(s): NCC13-01002
Report No.(s): NASA/NP-2003-12-00052; SSC-00191; No Copyright; Avail: CASI; A01, Hardcopy

Lightweight, flexible probes have been developed for measuring temperatures at multiple locations in tanks that contain possibly pressurized cryogenic fluids. If the fluid in a given tank is subcritical (that is, if it consists of a liquid and its vapor), then in one of two modes of operation, the temperature measurements made by a probe of this type can be used to deduce the approximate level of the liquid. The temperature sensors are silicon diodes located at intervals along a probe. If the probe is to be used to measure a temperature gradient along a given axis in the tank, then the probe must be mounted along that axis. In the non-liquid-level-sensing temperature-measurement mode, a constant small electric current is applied to each diode and the voltage across the diode . a known function of the current and temperature . is measured as an indication of its temperature. For the purpose of this measurement, 'small electric current' signifies a current that is not large enough to cause a significant increase in the measured temperature. More specifically, the probe design calls for a current of 10 A, which, in the cryogenic temperature range of interest, generates heat at a rate of only about 0.01 mW per diode. In the liquid-level-sensing mode, one applies a larger current (30 mA) to each diode so as to heat each diode appreciably (with a power of about 36 mW in the temperature range of interest). Because the liquid cools the diode faster than does the vapor, the temperature of the diode is less when diode is immersed in the liquid than when it is above the surface of the liquid. Thus, the temperature (voltage) reading from each diode can be used to determine whether the liquid level is above or below the diode, and one can deduce that the liquid level lies between two adjacent diodes, the lower one of which reads a significantly lower temperature. The aforementioned techniques for measuring temperature and deducing liquid level are not new. What is new here are the designs of the probes and of associated external electronic circuitry. In each probe, the diodes and the lead wires are embedded in a strong, lightweight, flexible polyimide strip. Each probe is constructed as an integral unit that includes a multipin input/output plug or socket for solderless connection of the lead wires to the external circuitry. The polyimide strip includes mounting tabs with holes that can accommodate rivets, screws, or other fasteners. Alternatively, a probe can be mounted by use of an epoxy. A probe can be manufactured to almost any length or width, and the diodes can be embedded at almost any desired locations along and across the polyimide strip. In designing a probe for a specific application, one seeks a compromise between (1) minimizing the number of diodes in order to minimize the complexity of input/output connections and external electronic circuitry while (2) using enough diodes to obtain the required precision. Optionally, to minimize spurious heating of the cryogenic fluid, the external circuitry can be designed to apply power to the probe only during brief measurement intervals. Assuming that the external circuitry is maintained at a steady temperature, a power-on interval of only a few seconds is sufficient to obtain accurate data on temperatures and/or the height of the liquid/vapor interface.
Author
Cryogenic Temperature; Liquid Levels; Temperature Probes; Cryogenic Fluids; Flexibility

20040046147 NASA Glenn Research Center, Cleveland, OH, USA

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials

Zhu, Dongming; Fox, Dennis S.; Bansal, Narottam P.; Miller, Robert A.; [2004]; 16 pp.; In English; 105th Annual Meeting and Exposition of The American Ceramic Society, 27-30 Apr. 2003, Nashville, TN, USA; No Copyright; Avail: CASI; A03, Hardcopy

HfO2-Y2O3 and La2Zr2O7 are candidate thermal/environmental barrier coating materials for gas turbine ceramic matrix composite (CMC) combustor liner applications because of their relatively low thermal conductivity and high temperature capability. In this paper, thermal conductivity and high temperature phase stability of plasma-sprayed coatings and/or hot-pressed HfO2-5mol%Y2O3, HfO2- 15mol%Y2O3 and La2Zr2O7 were evaluated at temperatures up to 1700 C using a steady-state laser heat-flux technique. Sintering behavior of the plasma-sprayed coatings was determined by monitoring the thermal conductivity increases during a 20-hour test period at various temperatures. Durability and failure mechanisms of the HfO2-Y2O3 and La2Zr2O7 coatings on mullite/SiC Hexoloy or CMC substrates were investigated at 1650 C under thermal gradient cyclic conditions. Coating design and testing issues for the 1650 C thermaVenvironmenta1 barrier coating applications will also be discussed.

Author

Thermal Conductivity; Water Vapor; Ceramic Coatings; Ceramic Matrix Composites; Combustion Chambers; High Temperature; Stability; Sprayed Coatings

20040046157 NASA Glenn Research Center, Cleveland, OH, USA

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow

Gilinsky, M.; Washington, C.; Blankson, I. M.; Shvets, A. I.; [2002]; 12 pp.; In English; 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, 7-10 Jul. 2002, Indianapolis, IN, USA

Contract(s)/Grant(s): NAG3-2422; CRDF-RE1-2068

Report No.(s): AIAA Paper 2002-3918; Copyright; Avail: CASI; A03, Hardcopy

The paper contains new numerical simulation and experimental test results of blunt body drag reduction using thin spikes mounted in front of a body and one- or two-phase jets injected against a supersonic flow. Numerical simulations utilizing the NASA CFL3D code were conducted at the Hampton University Fluid Mechanics and Acoustics Laboratory (FM&AL) and experimental tests were conducted using the facilities of the IM/MSU Aeromechanics and Gas Dynamics Laboratory. Previous results were presented at the 37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference. Those results were based on some experimental and numerical simulation tests for supersonic flow around spike-nosed or shell-nosed bodies, and numerical simulations were conducted only for a single spike-nosed or shell-nosed body at zero attack angle, alpha=0. In this paper, experimental test results of gas, liquid and solid particle jet injection against a supersonic flow are presented. In addition, numerical simulation results for supersonic flow around a multiple spike-nosed body with non-zero attack angles and with a gas and solid particle forward jet injection are included. Aerodynamic coefficients: drag, C(sub D), lift, C(sub L), and longitudinal momentum, M(sub z), obtained by numerical simulation and experimental tests are compared and show good agreement.

Author

Supersonic Flow; Numerical Analysis; Blunt Bodies; Drag Reduction; Spike Nozzles; Noses (Forebodies); Liquid Injection; Computerized Simulation

20040046889 NASA Glenn Research Center, Cleveland, OH, USA

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow

Gilinsky, M.; Blankson, I. M.; Sakharov, V. I.; Shvets, A. I.; [2004]; 13 pp.; In English; 37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, 8-11 Jul. 2001, Salt Lake City, UT, USA

Contract(s)/Grant(s): NAG1-2249; NAG3-2422; NAG3-2495; RE1-2068

Report No.(s): AIAA Paper 2001-3204; Copyright; Avail: CASI; A03, Hardcopy

The paper contains some experimental and numerical simulation test results on cylindrical blunt body drag reduction using thin spikes or shell mounted in front of a body against a supersonic flow. Experimental tests were conducted using the Aeromechanics and Gas Dynamics Laboratory facilities at the Institute of Mechanics of Moscow State University (IMMSU). Numerical simulations utilizing NASA and IM/MSU codes were conducted at the Hampton University Fluid Mechanics and Acoustics Laboratory. The main purpose of this research is to examine the efficiency of application of multiple spikes for drag reduction and flow stability at the front of a blunt body in different flight conditions, i.e. Mach number, angle of attack, etc. The principal conclusions of these test results are: multiple spike/needle application leads to decrease of drag reduction

benefits by comparison with the case of one central mounted needle at the front of a blunt body, but increase lift benefits.
Author
Shock Waves; Blunt Bodies; Supersonic Flow; Numerical Analysis; Experimentation; Drag Reduction

20040046908 Boeing Co., Canoga Park, CA, USA
NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction
Ferguson, Thomas V.; Williams, Morgan; Marcu, Bogdan; February 27, 2004; 154 pp.; In English
Contract(s)/Grant(s): NAS8-01040; NRA8-21
Report No.(s): RD04-133; No Copyright; Avail: CASI; A08, Hardcopy

This project was composed of three sub-tasks. The objective of the first task was to use the CFD code INS3D to generate both on- and off-design predictions for the consortium optimized impeller flowfield. The results of the flow simulations are given in the first section. The objective of the second task was to construct a turbomachinery testing database comprised of measurements made on several different impellers, an inducer and a diffuser. The data was in the form of static pressure measurements as well as laser velocimeter measurements of velocities and flow angles within the stated components. Several databases with this information were created for these components. The third subtask objective was two-fold: first, to validate the Enigma CFD code for pump diffuser analysis, and secondly, to perform steady and unsteady analyses on some wide flow range diffuser concepts using Enigma. The code was validated using the consortium optimized impeller database and then applied to two different concepts for wide flow diffusers.
Author
Impellers; Flow Distribution; Turbomachinery; Performance Tests; Pressure Measurement

20040050315 Lockheed Martin Corp., Syracuse, NY, USA, Rensselaer Polytechnic Inst., Troy, NY, USA
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe
Gurau, B.; Vassallo, P.; Keller, K.; Feb. 2002; 24 pp.; In English
Report No.(s): DE2004-820700; LM-02K001; No Copyright; Avail: Department of Energy Information Bridge

Local gas and liquid velocities are measured by cross-correlating signals from a double sensor hot-film anemometer probe in pure water flow and air water two-phase flow. The gas phase velocity measured in two-phase flow agrees with velocity data obtained using high-speed video to within +/-5%. A turbulent structure, present in the liquid phase, allows a correlation to be taken, which is consistent with the expected velocity profiles in pure liquid flow. This turbulent structure is also present in the liquid phase of a two-phase flow system. Therefore, a similar technique can be applied to measure the local liquid velocity in a two-phase system, when conditions permit.
NTIS
Air Flow; Liquid Flow; Liquid Phases; Phase Velocity; Vapor Phases; Velocity Measurement

20040050343 NASA Marshall Space Flight Center, Huntsville, AL, USA
Marangoni Convection and Deviations from Maxwells' Evaporation Model
Segre, P. N.; Snell, E. H.; Adamek, D. H.; [2003]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

We investigate the convective dynamics of evaporating pools of volatile liquids using an ultra-sensitive thermal imaging camera. During evaporation, there are significant convective flows inside the liquid due to Marangoni forces. We find that Marangoni convection during evaporation can dramatically affect the evaporation rates of volatile liquids. A simple heat balance model connects the convective velocities and temperature gradients to the evaporation rates.
Author
Convective Flow; Thermal Mapping; Evaporation Rate; Marangoni Convection

20040050367 Lawrence Livermore National Lab., Livermore, CA
Accuracy of Projection Methods for the Imcompressible Navier-Stokes Equation
Brown, D. L.; Jun. 12, 2001; 14 pp.; In English
Report No.(s): DE2004-15006270; UCRL-JC-144037; No Copyright; Avail: Department of Energy Information Bridge

Numerous papers have appeared in the literature over the past thirty years discussing projection-type methods for solving the incompressible Navier-Stokes equations. A recurring difficulty encountered is the choice of boundary conditions for the

intermediate or predicted velocity in order to obtain at least second order convergence. A further issue is the formula for the pressure correction at each timestep.
NTIS
Accuracy; Navier-Stokes Equation

20040050369 Lawrence Livermore National Lab., Livermore, CA
Statistical Error in Particle Simulations of Low Mach Number Flows
Hadjiconstantinou, N. G.; Garcia, A. L.; Nov. 13, 2000; 14 pp.; In English
Report No.(s): DE2004-15006287; UCRL-JC-141405; No Copyright; Avail: Department of Energy Information Bridge

We present predictions for the statistical error due to finite sampling in the presence of thermal fluctuations in molecular simulation algorithms. The expressions are derived using equilibrium statistical mechanics. The results show that the number of samples needed to adequately resolve the flow field scales as the inverse square of the Mach number. Agreement of the theory with direct Monte Carlo simulations shows that the use of equilibrium theory is justified.
NTIS
Computerized Simulation; Statistical Mechanics

20040050384 Lawrence Livermore National Lab., Livermore, CA
Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics
Anderson, R. W.; Pember, R. B.; Elliot, N. S.; Sep. 26, 2000; 16 pp.; In English
Report No.(s): DE2004-15006283; UCRL-JC-140555; No Copyright; Avail: Department of Energy Information Bridge

A new method for the solution of the unsteady Euler equations has been developed. The method combines staggered grid Lagrangian techniques with structured local adaptive mesh refinement (AMR). This method is a precursor to a more general adaptive arbitrary Lagrangian Eulerian (ALE-AMR) algorithm under development, which will facilitate the solution of problems currently at and beyond the boundary of soluble problems by traditional ALE methods by focusing computational resources where they are required. Many of the core issues involved in the development of the ALE-AMR method hinge upon the integration of AMR with a Lagrange step, which is the focus of the work described here. The novel components of the method are mainly driven by the need to reconcile traditional AMR techniques, which are typically employed on stationary meshes with cell-centered quantities, with the staggered grids and grid motion employed by Lagrangian methods. These new algorithmic components are first developed in one dimension and are then generalized to two dimensions. Solutions of several model problems involving shock hydrodynamics are presented and discussed.
NTIS
Lagrangian Function; Hydrodynamics

20040050674 Idaho Univ., Moscow, ID
The Boundary Layer Over Turbine Blade Models with Realistic Rough Surfaces
Budwig, Ralph S.; Mar. 2004; 14 pp.; In English
Contract(s)/Grant(s): F49620-00-1-0265
Report No.(s): AD-A420945; No Copyright; Avail: CASI; A03, Hardcopy

Surface roughness is known to have a significant impact on turbine heat loads and performance. Over time, as the turbine blades are exposed to these loads, the external surfaces become rougher, which results in increased heat loads and friction losses. The objective of the present investigation is to conduct measurements that will reveal the influence of realistic surface roughness on the near-wall behavior of the boundary layer. LDV measurements have been conducted in a Matched-Index-Of-Refraction (MIR) oil tunnel. The tunnel has been modified to operate with an accelerating freestream and an elevated freestream turbulence level in order to simulate conditions on the suction side of a high pressure turbine blade. We have made extensive boundary layer measurements over a smooth plate model and over a model with a strip of realistic rough surface. The realistic rough surface was developed by scaling actual turbine blade surface data that was provided by AFRL. The results include velocity profiles, streamwise and vertical turbulence intensity profiles, and Reynolds stress profiles. The oil tunnel arrangement has permitted velocity measurements very close to the wall (down to <1). These detailed results should be valuable to assess and guide development of computational fluid dynamics predictions.
DTIC
Boundary Layers; Turbine Blades

20040050723 Illinois Inst. of Tech., Chicago, IL

Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers

Nagib, Hassan M.; Mar. 9, 2004; 11 pp.; In English

Contract(s)/Grant(s): F49620-01-1-0445; Proj-2307

Report No.(s): AD-A421021; AFRL-SR-AR-TR-04-0167; No Copyright; Avail: CASI; A03, Hardcopy

In Part I of our work, mean velocity distributions in the overlap region, over the range of Reynolds, numbers 10, 000 <Re(theta) < 70,000, under five different pressure- gradient conditions are accurately described by a log law. The pressure-gradient conditions include adverse, zero, favorable, strongly favorable, and a complex condition. Parameters of the logarithmic overlap region developed from these higher Reynolds number boundary layers remain independent of Reynolds number when the boundary layers are under equilibrium conditions. The best estimate of the log-law parameters from the zero-pressure gradient boundary layers is k =0.37, B = 4.0. In Part II of our work a three-dimensional turbulent boundary layer over a flat plate is carefully documented with SPIV. At the first measurement station, the boundary layer is nearly two-dimensional before the secondary flow is generated via removal of mass through the side wall of the test section. The measurements are contrasted with Computations made using the commercial code by FLUENT.

DTIC

Boundary Layers; High Reynolds Number; Pressure Gradients; Turbulent Boundary Layer; Wall Pressure

20040050738 Princeton Univ., NJ

Dynamics of Droplet Collision and Flame Motion

Law, Chung K.; Mar. 8, 2004; 12 pp.; In English

Contract(s)/Grant(s): F49620-00-1-0092; Proj-2308

Report No.(s): AD-A421044; AFRL-SR-AR-TR-04-0166; No Copyright; Avail: CASI; A03, Hardcopy

The present program aims to study the dynamics of droplet collision and flame-flow interaction that are of relevance to liquid-fueled turbulent combustion in propulsive devices. The investigation involves experimental, computational, and analytical components. The program recognizes the fundamental similarity between droplet collision and flame dynamics, especially from the computational viewpoint, in that both phenomena involve the tracking of deformable surfaces separating two media of vastly different densities. During the reporting period four classes of phenomena were investigated, namely: (1) The dynamics of binary droplet collision, especially on the criterion for the breaking of the inter-droplet surfaces which enables droplet merging. (2) The dynamics of droplet-film collision, especially on the influence of the film thickness in effecting droplet bouncing versus absorption. (3) The dynamics of droplet-droplet collision of dissimilar liquids, showing that the initiation of droplet internal superheating and hence microexplosion can be greatly facilitated by the presence of air bubbles entrained upon coalescence of the colliding droplets. (4) The dynamics and interaction of a freely propagating premixed flame with a vortex pair, with particular attention on the extent of flame wrinkling and flame-generated vorticity due to the generation of the baroclinic torque through the intrinsic hydrodynamic instability.

DTIC

Collisions; Drops (Liquids); Flames; Hydrodynamics; Liquid Rocket Propellants

20040050751 Virginia Polytechnic Inst. and State Univ., Blacksburg, VA

The Near-Wall Behavior of Unsteady Vortical Flow Around the Tip of an Axial Pump Rotor Blade

Simpson, Roger L.; Dec. 15, 2003; 36 pp.; In English; Original contains color illustrations

Contract(s)/Grant(s): N00014-99-1-0302

Report No.(s): AD-A421059; No Copyright; Avail: CASI; A03, Hardcopy

Experimental study of three-dimensional turbulent tip gap flows in the linear cascade wind tunnel for two different tip gap clearances (t/c=1 .65% and 3.3%). Three experimental techniques are used to measure the tip gap velocity field and static pressure field on the end-wall: a three- orthogonal-velocity-component fiber-optic laser Doppler anemometer (3D-LDA) system, surface oil flow visualization, and a scani-valve pressure measurement system. The end-wall skin friction velocity is calculated from near-wall LDA data and pressure gradient data using the near-wall momentum equation. The statistics of Reynolds stresses and triple products in the two-dimensional turbulent boundary layer and three-dimensional turbulent boundary layer were examined using a velocity fluctuation octant analysis. For the three- dimensional turbulent boundary layer in the moving wall flow, the near-wall shear-flow reinforces the sweep motion to the moving wall and weakens the out-ward ejection motion in the shear flow dominant region. Between the passage flow and the shear flow is the interaction region of the high speed streaks and the low speed streaks. This is the first time that the coherent structure of the three-dimensional turbulent boundary in the linear cascade tip gap has been studied. Experimental study of the downstream behavior of vortex

generators used to simulate stator trailing vortices was also done as part of this program and was described in an earlier Technical Report.
DTIC
Unsteady Flow; Walls

35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Avionics and Aircraft Instrumentation*; and *19 Spacecraft Instrumentation and Astrionics*.

20040045333 NASA Glenn Research Center, Cleveland, OH, USA
Ice Particle Impact on Cloud Water Content Instrumentation
Emery, Edward F.; Miller, Dean R.; Plaskon, Stephen R.; Strapp, Walter; Lillie, Lyle; March 2004; 17 pp.; In English; 42nd Aerospace Sciences Meeting and Exhibit, 5-8 Jan. 2004, Reno, NV, USA
Contract(s)/Grant(s): WBS 22-728-41-15
Report No.(s): NASA/TM-2004-212964; AIAA Paper 2004-0731; NAS 1.15:212964; E-14437; No Copyright; Avail: CASI; A03, Hardcopy

Determining the total amount of water contained in an icing cloud necessitates the measurement of both the liquid droplets and ice particles. One commonly accepted method for measuring cloud water content utilizes a hot wire sensing element, which is maintained at a constant temperature. In this approach, the cloud water content is equated with the power required to keep the sense element at a constant temperature. This method inherently assumes that impinging cloud particles remain on the sensing element surface long enough to be evaporated. In the case of ice particles, this assumption requires that the particles do not bounce off the surface after impact. Recent tests aimed at characterizing ice particle impact on a thermally heated wing section, have raised questions about the validity of this assumption. Ice particles were observed to bounce off the heated wing section a very high percentage of the time. This result could have implications for Total Water Content sensors which are designed to capture ice particles, and thus do not account for bouncing or breakup of ice particles. Based on these results, a test was conducted to investigate ice particle impact on the sensing elements of the following hot-wire cloud water content probes: (1) Nevzorov Total Water Content (TWC)/Liquid Water Content (LWC) probe, (2) Science Engineering Associates TWC probe, and (3) Particle Measuring Systems King probe. Close-up video imaging was used to study ice particle impact on the sensing element of each probe. The measured water content from each probe was also determined for each cloud condition. This paper will present results from this investigation and attempt to evaluate the significance of ice particle impact on hot-wire cloud water content measurements.
Author
Cloud Physics; Ice; Moisture Content

20040046948 Defence Science and Technology Organisation, Fishermans Bend, Australia
Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers
Marian, Frank; Box, Phillip; McLean, Andrew; November 2003; 20 pp.; In English
Report No.(s): DSTO-TN-0525; DODA-AR-012-971; Copyright; Avail: Other Sources

Maritime Platforms Division (MPD) has manufactured a calibrator for determining the sensitivities of air blast and underwater pressure transducers with nominal ranges up to 100,OOO kPa, which is the design limit of the transfer standard used. This paper describes the design of the calibrator, the process and analysis used to provide traceable calibration results.
Author
Aerial Explosions; Impulses; Pressure Sensors

20040047025 Ljubljana Univ., Ljubljana, Slovenia
Context Dependent Digital Image Shape Coding
Kosir, Andrej; Tasic, Jurij; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 66-71; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

In this paper, an alternative approach to the digital image region coding based on a predefined set of shapes (regions) is presented. The motivation of the definition and construction was function approximation using Fourier series. The goal of such shape coding is to extract progressive shape codes containing global shape information applicable for further digital image

analysis, mainly image content analysis. The major objective of this work is to define a digital image shape code, construct an extraction algorithm with a very low computational complexity and prove certain properties of the proposed shape code. Robustness to the segmentation errors of the resulting shape code is estimated. A computational complexity and of the underlying algorithm is given. Shape is defined as an image region with nonempty interior. An algorithm for a shape code extraction with error estimation and convergence properties is described. It is based on breadth-first-search graph procedure. An evaluation of the proposed technique in terms of shape feature clustering is given. Conclusion remarks and further work are added at the end.
Author
Image Analysis; Shapes; Coding; Pattern Recognition

20040047026 Ljubljana Univ., Ljubljana, Slovenia
Video Object Shape Coding Using Control Point Optimization
Zaletelj, Janez; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 72-78; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

This paper addresses the problem of optimal encoding of binary shape masks of video objects. In the context of object-based video coding, shape information is crucial for content-based access and manipulation of video streams. The proposed method reduces temporal shape correlation by finding correspondences between polygon vertices in successive frames. Using an iterated refinement method shape is approximated in each frame, thus satisfying the maximum allowable distortion criterion. Matching of vertices is based on the sum of displacements, which is minimized globally. This allows the use of inter-frame relative addressing, which greatly reduces the dynamic range and consequently the bit rate.
Author (revised)
Shapes; Optimization; Coding; Video Data

20040050632 Sest, Inc., Middleburgh Heights, OH, USA
Free-Piston Stirling Convertor Controller Development at NASA Glenn Research Center
Regan, Timothy; March 2004; 13 pp.; In English; First International Energy Conversion Engineering Conference, 17-21 Aug. 2003, Portsmouth, VA, USA
Contract(s)/Grant(s): NAS3-03064; WBS-22-972-20-01; WBS-22-972-30-01
Report No.(s): NASA/CR-2004-213038; AIAA Paper 2003-5931; NAS 1.26:213038; E-14466; No Copyright; Avail: CASI; A03, Hardcopy

The free-piston Stirling convertor end-to-end modeling effort at NASA Glenn Research Center (GRC) has produced a software-based test bed in which free-piston Stirling convertors can be simulated and evaluated. The simulation model includes all the components of the convertor - the Stirling cycle engine, linear alternator, controller, and load. This paper is concerned with controllers. It discusses three controllers that have been studied using this model. Case motion has been added to the model recently so that effects of differences between convertor components can be simulated and ameliorative control engineering techniques can be developed. One concern when applying a system comprised of interconnected mass-spring-damper components is to prevent operation in any but the intended mode. The design mode is the only desired mode of operation, but all other modes are considered in controller design.
Author
Computer Programs; Stirling Cycle; Converters

20040050646 Tanner Research, Inc., Pasadena, CA
Biological and Silicon Modeling of Moving Target Detection in Insects
Shoemaker, Patrick; O'Carroll, David; Dec. 2003; 55 pp.; In English
Contract(s)/Grant(s): F49620-01-C-0030
Report No.(s): AD-A420888; AFRL-SR-AR-TR-04-0147; No Copyright; Avail: CASI; A04, Hardcopy

In this project, we studied the physiology of a class of visual neurons that we have labeled small target, movement detectors (STMDs), which respond selectively to small moving visual targets. In-vivo intracellular recordings were made in several model species (the hoverfly Eristalis tenax and the dragonflies Hemicordulia tau and Aeshna multicolor), while subject to moving visual displays. We found some STMD neurons are capable of responding selectively to small moving targets against moving cluttered backgrounds. We characterized the receptive field properties of a class of small-field STMDs that we labeled elementary small target movement detectors' (ESTMDs), which may be an early stage in a hierarchy of STMD processing. Models were developed for aspects of the processing performed by STMD neurons, and tested in simulations. In

particular, a model for the ESTMD was developed and implemented in analog VLSl silicon.
DTIC
Detection; Insects; Silicon; Target Acquisition; Targets

20040050733 North Carolina Univ., Chapel Hill, NC
The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR)
Evans, Charles R.; Clemens, J. C.; Mar. 21, 2003; 29 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): F29601-98-1-0032; Proj-1003
Report No.(s): AD-A421038; AFRL-DE-TR-2003-1101; No Copyright; Avail: CASI; A03, Hardcopy

This document is the final report on progress in constructing the SOAR telescope. SOAR has been built with partial support from an AFRL grant (F29601-98-l-0032) to the University of North Carolina. This report is intended to provide the Air Force Research Laboratory (AFRL) with both an overview of the work done in the past 12 months (from March 2002 through March 2003) and an overall summary of the status of the telescope and facility at the completion of the grant. SOAR is a 4.2-meter aperture telescope employing state-of-the- art technologies to deliver high-resolution images, which are limited only by the excellent seeing conditions of its site on Cerro Pachon in northern Chile. It is designed to operate from the near-ultraviolet through the
DTIC
Astronomy; Observatories; Telescopes

20040050742 California Univ., Santa Barbara, CA
Large Amplitude Vibrational Influence on Electron Transfer Reactions
Wodtke, A. M.; Mar. 11, 2004; 26 pp.; In English
Contract(s)/Grant(s): F49620-01-1-0193
Report No.(s): AD-A421048; AFRL-SR-AR-TR-04-0159; No Copyright; Avail: CASI; A03, Hardcopy

Our research into the chemical properties of highly vibrationally excited molecules has revealed a strong connection between large amplitude vibrational motion and the ability of a molecule to accept or donate electrons. In this proposal, we explain the work leading up to this insight and suggest ways to further test our understanding of this phenomenon. We suggest two experiments to extrapolate these results to completely new kinds of chemical encounters: the vibrational enhancement of electron capture and the direct observation of vibrational promotion of an electron transfer reaction. This work may have significant implications for electron scavenging around re-entry vehicles and accompanying communications blackouts.
DTIC
Electron Transfer; Infrared Signatures; Molecular Dynamics; Vibration

20040050753 George Mason Univ., Fairfax, VA
Intrusion Detection Using Data Mining Techniques
Wegman, Edward J.; Faxon, Don R.; Jan. 2004; 16 pp.; In English
Contract(s)/Grant(s): F49620-01-1-0274; CFDA-12.630
Report No.(s): AD-A421061; TR-2003-03; AFRL-SR-AR-TR-04-0157; No Copyright; Avail: CASI; A03, Hardcopy

Principal Investigator and research fellows conduct research in the investigation of network-based intrusion detection using data mining techniques based on advanced computational statistics and visualization techniques. These new methods will provide the means to detect the presence of covert channels operating on user systems, passively perform continuous user authentication, discern subtle network attacks and information-gathering activities, and provide interface support for 'storm center' situational display of intrusion detection alerts, damage assessment, and current network state-of-health.
DTIC
Data Mining; Detection; Information Retrieval; Security; Warning Systems

36
LASERS AND MASERS

Includes lasing theory, laser pumping techniques, maser amplifiers, laser materials, and the assessment of laser and maser outputs. For cases where the application of the laser or maser is emphasized see also the specific category where the application is treated. For related information see also *76 Solid-State Physics*.

20040050721 Yale Univ., New Haven, CT
P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing
Chang, Richard K.; Nov. 2003; 7 pp.; In English
Contract(s)/Grant(s): F49620-00-1-0182; Proj-2305
Report No.(s): AD-A421018; AFRL-SR-AR-TR-04-0156; No Copyright; Avail: CASI; A02, Hardcopy

The objectives of the past 12 months has been directed toward greater understanding of the laser emission from the spiral structure and achieving for the first time, electrically pumped spiral micro-lasers. Another objective was to develop micro-amplifiers which could increase the output emission. During the October 2002 site visit of Lt. Col. John Carrano of DARPA and program manager of the SUVOS program, it became apparent that the low scale collaboration between Yale and PARC was so successful and providing exciting possibilities, that Lt. Col. Carrano stepped up the funding for PARC to increase their collaboration efforts with Yale. Therefore, besides just providing samples for us in our optical pumping approach, as was the case in the past, PARC began to actively investigate the electrical pumping approach with close collaboration with the Yale group.
DTIC
Detection; Junction Diodes; Optical Resonators; P-N Junctions; Semiconductor Lasers; Ultraviolet Lasers

20040050763 Air Force Inst. of Tech., Wright-Patterson AFB, OH
Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers
Vap, Jason C.; May 2004; 99 pp.; In English
Report No.(s): AD-A421079; AFIT-CI04-136; No Copyright; Avail: CASI; A05, Hardcopy

The goal of this thesis was to design a constant modulation current bias circuit for measuring the single-pole, small-signal optical response of a semiconductor laser between 1MHz and 10Hz. The results of this design will be used to conduct carrier lifetime measurements with the impedance independent optical response technique essential for determining the carrier density in the active region of the semiconductor laser, and extracting the A, B, and C coefficients of the spontaneous recombination rate equation.
DTIC
Bias; Circuits; Models; Modulation; Semiconductor Lasers

37
MECHANICAL ENGINEERING

Includes mechanical devices and equipment; machine elements and processes. For cases where the application of a device or the host vehicle is emphasized see also the specific category where the application or vehicle is treated. For robotics see *63 Cybernetics, Artificial Intelligence, and Robotics*; and *54 Man/System Technology and Life Support*.

20040045252 Science Applications International Corp., Moffett Field, CA, USA
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems
Mulloth, Lila M.; Affleck, Dave L.; Rosen, Micha; LeVan, M. Douglas; Wang, Yuan; Cavalcante, Celio L.; [2004]; 1 pp.; In English; 34rd International Conference on Environmental Systems Meeting, 19-22 Jul. 2004, Colorado Springs, CO, USA
Contract(s)/Grant(s): 131-20-10; No Copyright; Avail: Other Sources; Abstract Only

The air revitalization system of the International Space Station (ISS) operates in an open loop mode and relies on the resupply of oxygen and other consumables from earth for the life support of astronauts. A compressor is required for delivering the carbon dioxide from a removal assembly to a reduction unit to recover oxygen and thereby closing the air-loop. We have a developed a temperature-swing adsorption compressor (TSAC) for performing these tasks that is energy efficient, quiet, and

has no rapidly moving parts. This paper discusses the mechanical design and the results of thermal model validation tests of a TSAC that uses air as the cooling medium.
Author
Adsorption; Air Cooling; Compressors; International Space Station; Feedback Control; Air Purification; Mechanical Engineering; Temperature Dependence

20040045255 NASA Ames Research Center, Moffett Field, CA, USA
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes
Fisher, John; Wignarajah, K.; Howard, Kevin; Serio, Mike; Kroo, Eric; January 2004; 1 pp.; In English; 34th International Conference on Environmental Systems, 19-22 Jul. 2004, Colorado Springs, CO, USA; No Copyright; Avail: Other Sources; Abstract Only

The prototype dry pyrolyser delivered to Ames Research Center is the end-product of a Phase I1 Small Business Initiative Research (SBIR) project. Some of the major advantages of pyrolysis for processing solid wastes are that it can process solid wastes, it permits elemental recycling while conserving oxygen use, and it can function as a pretreatment for combustion processes. One of the disadvantages of pyrolysis is the formation of tars. By controlling the rate of heating, tar formation can be minimized. This paper presents data on the pyrolysis of various space station wastes. The performance of the pyrolyser is also discussed and appropriate modifications suggested to improve the performance of the dry pyrolyzer.
Author
Evaluation; Functions; Solid Wastes; Recycling; Pyrolysis; Prototypes

20040050629 NASA Glenn Research Center, Cleveland, OH, USA
Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C
Stanford, Malcolm K.; DellaCorte, Christopher; March 2004; 18 pp.; In English
Contract(s)/Grant(s): WBS-22-708-18-04
Report No.(s): NASA/TM-2004-212972; NAS 1.15:212972; E-14445; No Copyright; Avail: CASI; A03, Hardcopy

The friction and wear performance of a Cu-4Al top foil coating has been investigated in Generation I foil air bearings. The copper alloy was applied by a novel deposition technique (ion diffusion) and the journal was coated with PS304, a plasma spray deposited high temperature composite solid lubricant coating. The ion diffusion coating process deposits a desirable smooth layer compared to other methods like cathodic arc deposition. The tribological performance of bearings with and without Cu-4Al foil coatings were evaluated through start-stop tests on an air bearing test rig at 25 and 650 C. The results indicate that the Cu-4Al assists during the initial break-in period, gives more stable friction performance with respect to temperature, and appears to prevent top foil wear at high temperature. The measured load capacity coefficient was 0.5, which was comparable to earlier testing of more advanced design Generation III bearings coated with standard cathodic arc deposited Cu-4Al. However, further studies are needed to determine if deeper penetration of the copper alloy into the foil would help make the transition in friction behavior from contact with the Cu-4Al coated foil to contact with the base foil material more gradual. Also, future work is recommended to assess the performance of ion diffusion coatings with different Cu-based alloy compositions and to investigate the effect the coating has on the elastic modulus of the foil material.
Author
Coating; Copper Alloys; Aluminum Coatings; Foil Bearings; High Temperature Lubricants; Wear; Friction

20040050630 NASA Glenn Research Center, Cleveland, OH, USA
Ballistic Impact of Braided Composites With a Soft Projectile
Roberts, Gary D.; Pereira, J. Michael; Revilock, Duane M., Jr.; Binienda, Wieslaw; Xie, Ming; Braley, Mike; March 2004; 14 pp.; In English; 44th Structures, Structural Dynamics, and Materials Conference, 7-10 Apr. 2003, Norfolk, VA, USA
Contract(s)/Grant(s): WBS-22-708-24-13
Report No.(s): NASA/TM-2004-212973; AIAA Paper 2003-1757; NAS 1.15:212973; E-14395-1; No Copyright; Avail: CASI; A03, Hardcopy

Impact tests using a soft gelatin projectile were performed to identify failure modes that occur at high strain energy density during impact loading. Use of a soft projectile allows a large amount of kinetic energy to be transferred into strain energy in the target before penetration occurs. Failure modes were identified for flat aluminum plates and for flat composite plates made from a triaxial braid having a quasi-isotropic fiber architecture with fibers in the 0 and +/- 60 deg. directions. For the aluminum plates, a large hole formed as a result of crack propagation from the initiation site at the center of the plate to the fixed

boundaries. For the composite plates, fiber tensile failure occurred in the back ply at the center of the plate. Cracks then propagated from this site along the +/- 60 deg. fiber directions until triangular flaps opened to allow the projectile to pass through the plate. The damage size was only slightly larger than the initial impact area. It was difficult to avoid slipping of the fixed edges of the plates during impact, and slipping was shown to have a large effect on the penetration threshold. Failure modes were also identified for composite half-rings fabricated with the 0 deg. fibers aligned circumferentially. Slipping of the edges was not a problem in the half-ring tests. For the composite half-rings, fiber tensile failure also occurred in the back ply. However, cracks initially propagated from this site in a direction transverse to the 0 deg. fibers. The cracks then turned to follow the +/- 60 deg. fibers for a short distance before turning again to follow 0 deg. fibers until two approximately rectangular flaps opened to allow the projectile to pass through the plate. The damage size in the composite half-rings was also only slightly larger than the initial impact area. Cracks did not propagate to the boundaries, and no delamination was observed. The damage tolerance demonstrated by the quasi-isotropic triaxial braid composites indicate that composites of this type can reasonably be considered as a lightweight alternative to metals for fan cases in commercial jet engines.
Author
Impact Loads; Impact Tests; Kinetic Energy; Gelatins; Failure Modes; Crack Propagation

20040050799 Boston Univ., Boston, MA
Design Methods for Machinery Emulators
Dupont, Pierre E.; Feb. 27, 2004; 17 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): N00014-01-1-0155
Report No.(s): AD-A421133; No Copyright; Avail: CASI; A03, Hardcopy

The realization of electromechanical dynamic systems possessing specified input-output dynamic properties is studied. Applications of this problem include the scaled shock and vibration testing of machinery and the design of electromechanical filters. A two-step realization process was developed by which both passive and active systems can be realized. Two techniques have been developed to obtain realizable models for the design of passive mechanical systems. The first technique involves searching the parameterized space of congruent coordinate transformations relating input- output equivalent second order models for those that are realizable, i.e., those that can be directly interpreted as a network of mechanical elements. The second technique involves estimating realizable models which include both distributed and lumped mechanical elements directly from experimental machinery data. Active emulation is achieved by adding vibration sources, e.g., shakers, to the passive structure. These sources are driven under closed-loop control so as to produce the desired level of vibration at the output locations. Experimental evaluation of these techniques has been carried out through the design of a modular machinery emulator, which can be adapted to match the mass and dynamic properties of a desired machine within a frequency range of interest.
DTIC
Electromechanical Devices

20040050806 Auburn Univ., AL
Development of a Valve-Less Meso-Scale Pump
Khodadadi, Jay M.; Sweeney, Mattew; Mar. 8, 2004; 6 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): N00014-02-11024
Report No.(s): AD-A421140; No Copyright; Avail: CASI; A02, Hardcopy

Development of a simple valve-less meso-scale pump as a physical model for operation of a similar micron-scale pump is discussed. The principle of operation of the pump is based on the differing flow resistance properties of nozzles and diffusers. The cavity, nozzle, diffuser and side reservoirs were fabricated by precision-machining of Lexan. The vibrating diaphragm assembly is a brass thin sheet and a piezoelectric disc that is attached to it thus forming one end of the cavity. Once the operational characteristics of the pump in the form of pressure drop vs. pumped mass flowrate is determined, the data can be compared to the predictions based on a theoretical model.
DTIC
Pumps; Valves

38
QUALITY ASSURANCE AND RELIABILITY

Includes approaches to, and methods for reliability analysis and control, quality control, inspection, maintainability, and standardization.

20040047022 Nuklearni Inst. Jozef Stefan, Ljubljana, Slovenia
Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling
Cepin, Marko; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 22-26; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

Testing and maintenance of safety equipment in nuclear power plants represent an important potential for risk and cost reduction. An optimization method was developed based on integration of the probabilistic safety assessment, and simulated annealing. The method determines the optimal scheduling of the standby safety equipment outages to allow for testing and maintenance. It is based on minimization of the selected risk measure (e.g. probability of the system fault or accident frequency). The mean value of the selected time dependent risk measure represents the optimization function. It is calculated from time dependent values. The time dependent function of the selected risk measure is obtained from the probabilistic safety assessment, i.e. from the fault tree analysis at the system level and from the fault tree/event tree analysis at the plant level, both extended with the inclusion of time requirements. The outline of the method optimization algorithm is shown. The Rastrigin function which was used for the algorithm performance testing is shown. The method was then employed to evaluate a studied system consisting of three pumps and seven valves delivering water to two injection paths. Results showed that is is possible to reduce risk by applying the proposed method. Two cases of convergence of the optimization function are shown. The resulting probability of the system fault that is based on the results of the second case is depicted. Because of considerably large uncertainties in the probabilistic safety assessment, the most important result of the method may not be the selection of the most suitable schedule of safety equipment outages among those that result in a similarly low risk. It may nevertheless prevent such schedules of safety equipment outages that may result in a high risk.
Author (revised)
Nuclear Power Plants; Reactor Safety; Optimization; Safety Management; Maintenance; Scheduling

39
STRUCTURAL MECHANICS

Includes structural element design, analysis and testing; dynamic responses of structures; weight analysis; fatigue and other structural properties; and mechanical and thermal stresses in structures. For applications see *05 Aircraft Design, Testing and Performance*; and *18 Spacecraft Design, Testing and Performance*.

20040046913 NASA Langley Research Center, Hampton, VA, USA
Analysis of SMA Hybrid Composite Structures using Commercial Codes
Turner, Travis L.; Patel, Hemant D.; March 30, 2004; 12 pp.; In English; SPIE 11th Annual International Symposium on Smart Structures and Materials, 14-18 Mar. 2004, San Diego, CA, USA
Contract(s)/Grant(s): 23-762-55-MO
Report No.(s): SPIE-5383-12; Copyright; Avail: CASI; A03, Hardcopy

A thermomechanical model for shape memory alloy (SMA) actuators and SMA hybrid composite (SMAHC) structures has been recently implemented in the commercial finite element codes MSC.Nastran and ABAQUS. The model may be easily implemented in any code that has the capability for analysis of laminated composite structures with temperature dependent material properties. The model is also relatively easy to use and requires input of only fundamental engineering properties. A brief description of the model is presented, followed by discussion of implementation and usage in the commercial codes. Results are presented from static and dynamic analysis of SMAHC beams of two types; a beam clamped at each end and a cantilevered beam. Nonlinear static (post-buckling) and random response analyses are demonstrated for the first specimen. Static deflection (shape) control is demonstrated for the cantilevered beam. Approaches for modeling SMAHC material systems with embedded SMA in ribbon and small round wire product forms are demonstrated and compared. The results from the commercial codes are compared to those from a research code as validation of the commercial implementations; excellent correlation is achieved in all cases.
Author
Composite Structures; Hybrid Composites; Shape Memory Alloys; Thermodynamics; Actuators; Mathematical Models; Dynamic Structural Analysis

20040050712 Congressional Budget Office, Washington, DC
A CBO PAPER: Paying for Iraq'a Reconstruction
Jan. 2004; 39 pp.; In English
Report No.(s): AD-A421006; No Copyright; Avail: CASI; A03, Hardcopy

REBUILDING Iraq after 25 years of rule by Saddam Hussein and the war that overthrew his government will be one of the USA' foreign policy priorities in the coming years. By some estimates, the cost of reconstructing Iraq ranges from $50 billion to $100 billion. However, substantial disagreement exists about that cost, as well as about how much aid from the international community may be needed to rebuild the country, whether that aid should take the form of grants or loans, how much the USA should contribute, and how much Iraq can finance itself from its future sources of revenue. To assess the scope of the reconstruction job, the Coalition Provisional Authority (CPA), the United Nations and World Bank, and the Bechtel Corporation (under contract to the U.S. Agency for International Development) carried out surveys of Iraq's needs in 2003. The needs that they identified are mainly associated with the deterioration of Iraqi infrastructure that has occurred since Iraq invaded Iran in 1980. The surveys indicate that although sanctions imposed during the 1990s and damage from recent postwar looting have worsened the condition of Iraq's infrastructure, they are not the most significant cause of its poor state.
DTIC
Construction; Cost Estimates; Iraq

42
GEOSCIENCES (GENERAL)

Includes general research topics related to the Earth sciences, and the specific areas of petrology, mineralogy, and general geology. For other specific topics in geosciences see *categories 42 through 48*.

20040050248 West Virginia Univ., Morgantown, WV, USA
Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001
Peng, S. S.; Oct. 2001; 12 pp.; In English
Report No.(s): DE2004-819900; No Copyright; Avail: Department of Energy Information Bridge

Roof bolting is the most popular method for underground openings in the mining industry, especially in the bedded deposits such as coal, potash, salt etc. In fact, all U.S. underground coal mine entries are roof-bolted as required by law. However, roof falls still occur frequently in the roof bolted entries. The two possible reasons are: the lack of knowledge of and technology to detect the roof geological conditions in advance of mining, and lack of roof bolting design criteria for modern roof bolting systems. This research is to develop a method for predicting the roof geology and stability condition in real time during roof bolting operation. Based on such information, roof bolting design criteria for modern roof bolting systems will be developed for implementation in real time.
NTIS
Roofs; Bolts; Drilling; Structural Properties (Geology); Mines (Excavations)

20040050937 State Univ. of New York, Buffalo, NY, USA, Waseda Univ., Tokyo, Japan, University of Southern California, Los Angeles, CA, USA
Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th)
Hamada, M.; Bardet, J. P.; ORourke, T. D.; Jun. 30, 2003; In English
Report No.(s): PB2004-104386; MCEER-03-0003; No Copyright; Avail: National Technical Information Service (NTIS)

The proceedings of this workshop are part of a longstanding US-Japan cooperative research activity that focuses on earthquake resistant design of lifeline facilities and countermeasures against soil liquefaction. Since its inception, this activity has assisted other research agendas, such as cooperative research among the U.S. Earthquake Engineering Research Centers and the U.S.-Japan Cooperative Research Program on Urban Earthquake Disaster Mitigation. In the future, US-Japan cooperative research on lifelines and liquefaction will benefit from collaborative experimentation and analytical modeling at many of the superb testing facilities both in Japan and within the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES).
NTIS
Earthquake Resistant Structures; Mathematical Models; Soils; Earthquakes

43
EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth features, phenomena and resources by aircraft, balloon, rocket, and spacecraft; analysis of remote sensing data and imagery; development of remote sensing products; photogrammetry; and aerial photography. For related instrumentation see *35 Instrumentation and Photography*.

20040046141 NASA Ames Research Center, Moffett Field, CA, USA
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling
Johnson, Lee F.; Scholasch, Thibaut; [2004]; 10 pp.; In English
Contract(s)/Grant(s): NAG13-99020; 613-16-00; No Copyright; Avail: CASI; A02, Hardcopy

Normalized difference vegetation index (NDVI) data, acquired at two-meter resolution by an airborne ADAR System 5500, were compared with fraction of photosynthetically active radiation (FPAR) absorbed by commercial vineyards in Napa Valley, California. An empirical line correction was used to transform image digital counts to surface reflectance. 'Apparent' NDVI (generated from digital counts) and 'corrected' NDVI (from reflectance) were both strongly related to FPAR of range 0.14-0.50 (both r(sup 2) = 0.97, P < 0.01). By suppressing noise, corrected NDVI should form a more spatially and temporally stable relationship with FPAR, reducing the need for repeated field support. Study results suggest the possibility of using optical remote sensing to monitor the transpiration crop coefficient, thus providing an enhanced spatial resolution component to crop water budget calculations and irrigation management.
Author
Vineyards; Remote Sensing; Normalized Difference Vegetation Index; Photosynthetically Active Radiation; Farm Crops; Irrigation

20040047248 NASA Marshall Space Flight Center, Huntsville, AL, USA
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing
Chen, Feng; Kissel, David E.; West, Larry T.; Rickman, Doug; Luvall, J. C.; Adkins, Wayne; January 2004; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

The organic C concentration of surface soil can be used in agricultural fields to vary crop production inputs. Organic C is often highly spatially variable, so that maps of soil organic C can be used to vary crop production inputs using precision farming technology. The objective of this research was to demonstrate the feasibility of mapping soil organic C on three fields, using remotely sensed images of the fields with a bare surface. Enough soil samples covering the range in soil organic C must be taken from each field to develop a satisfactory relationship between soil organic C content and image reflectance values. The number of soil samples analyzed in the three fields varied from 22 to 26. The regression equations differed between fields, but gave highly significant relationships with R2 values of 0.93, 0.95, and 0.89 for the three fields. A comparison of predicted and measured values of soil organic C for an independent set of 2 soil samples taken on one of the fields gave highly satisfactory results, with a comparison equation of % organic C measured + 1.02% organic C predicted, with r2 = 0.87.
Author
Carbon; Crop Growth; Remote Sensing; Soil Mapping; Soil Sampling

20040050334 Cornell Univ., NY, USA
An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake
Mathieu, Jennifer; September 08, 2003; 3 pp.; In English; No Copyright; Avail: CASI; A01, Hardcopy

The three areas of focus in this integrative dissertation are hydroponic lettuce crop evapotransportation, nitrate uptake, and growth simulation modeling. The evapotransportation model is based on the Penman-Monteith equation. The NICOLET (nitrate control in lettuce) model is used for the nitrate uptake simulation model. Finally, a crop growth model is adapted for integration of evapotranspiration and nitrate uptake models. If a crop growth simulation model is expanded to calculate water and nitrate uptake of a crop, the resulting model could be used for both growth simulation and early fault detection in hydroponics systems. Knowing the quantity of water and nitrate uptake for optimal crop measuring these parameters. The effect of crop stress on the root zone environment of plants is not well understood. By testing the proposed simulation model, the effect of crop stress on water and nitrate uptake may be better understood. Therefore, comparing measured values of crop evapotranspiration and nitrate uptake rates to values predicted by crop specific simulation models in real-time is hypothesized to provide early fault or problem detection in hydroponic crop production systems. A rapid response and accurate fault detection system for the root zone of a hydroponic system is desirable to warm the operator of system malfunctions before there are visible signs of a problem. Crop water and nitrate uptake by roots are independent non-destructive measure of plant

performance which provides ideal parameters to detect stress or faults in the root zone of hydroponic systems; thereby reducing the risk associated with hydroponic crop production.
Derived from text
Hydroponics; Fault Detection; Water; Vegetables

20040050355 NASA Marshall Space Flight Center, Huntsville, AL, USA
Early Results of the NASA Convection and Moisture Experiment (CAMEX)
Hood, Robbie; Kakar, Ramesh; [2004]; 1 pp.; In English; 58th Interdepartment Hurricane Conference, 29 Feb. - 5 Mar. 2004, Charleston, SC, USA; No Copyright; Avail: Other Sources; Abstract Only

As reported at previous sessions of the Interdepartmental Hurricane Conference, the Office of Earth Science within the National Aeronautics and Space Administration (NASA) has been sponsoring the Convection And Moisture Experiment (CAMEX) since 1993. Although originally designed to support satellite calibration and validation activities and to demonstrate new remote sensing technology pertinent to the global water cycle, the CAMEX research objectives have evolved to include a strong emphasis on hurricane observational studies. A hallmark of CAMEX success has been fruitful research collaborations with the Hurricane Research Division (HRD) of the National Oceanic and Atmospheric Administration (NOAA) and the Hurricanes At Landfall Initiative of the USA Weather Research Program. Satellite, aircraft, and ground-based observations collected during the 1998 and 200 1 field phases of CAMEX represent a wealth of information describing the three dimensional structure of tropical cyclones. Early research results gleaned from these observations have been submitted to a special issue of the American Meteorological Society Journal of Atmospheric Sciences. An overview of these early findings and their expected significance to the operational community will be presented during this talk.
Author
NASA Programs; Moisture; Earth Sciences; Remote Sensing; Convection

20040050533 NASA Marshall Space Flight Center, Huntsville, AL, USA
Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape
Sever, Thomas L.; Saturno, William; Irwin, Daniel E.; [2004]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

A common problem for archaeologists studying ancient settlement in the Maya Lowlands is overcoming the dense vegetation in order to obtain an accurate regional perspective of the presence of archaeological sites, their exact locations and their overall extents. Most often this is done by extensive ground surveys in which many individuals chop parallel paths through the vegetation in search of sites. Once a site is found an effort is made to mark its location on a regional map and to explore its perimeter. Obtaining locational information has been made dramatically easier in recent years with the advent of improved Global Positioning Systems (GPS), however the process of initial identification of sites and the determination of their borders is exceedingly labor intensive and has remained relatively unchanged since the beginning of settlement surveys in the region in the 1950's. Currently, we are revolutionizing settlement survey in the Maya Lowlands by using remotely sensed data from IKONOS, Quickbird, and Eol, satellites. The Ancient Maya built their cities, towns and even their smallest hamlets using excavated limestone and lime plasters. We propose that the decay of these structures provides a unique microenvironment for the growth of vegetation as the levels of moisture and nutrition within the ruins vary substantially from those in the surrounding forest. These microenvironmental differences on the ground are likewise represented by compositional differences in the forest canopy both in the species present and in leaf color (representing moisture/nutritional stress) visible through the analysis of high- resolution satellite data. In this way the detailed analysis of forest composition can reveal a detailed picture of the ancient settlements that lie beneath it. Preliminary examinations using this technique have been very successful and we are refining these techniques in order to efficiently comprehend the details of Ancient Maya settlement in the Lowlands.
Author
Global Positioning System; Remote Sensing; Archaeology; Topography

20040050581 Colorado Univ., Boulder, CO, USA
Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data
Maslanik, James A.; [2004]; 55 pp.; In English
Contract(s)/Grant(s): NAG5-9861; No Copyright; Avail: CASI; A04, Hardcopy

The importance of sea ice leads in the ice-ocean-atmosphere system lies in the fact that each of the boxes in the 'surface

processes' interface in this diagram is closely linked to lead conditions. For example, heat, moisture and salt exchange between the Ocean and atmosphere within the ice pack occur nearly entirely through leads. The shear, divergence and convergence associated with lead formation and closure alter surface and basal roughness and topography, which in turn affects momentum transfer in the atmosphere and ocean boundary layers, and modifies the accumulation of snow on the ice surface, which then affects heat conduction and summertime albedo. In addition to providing openings for loss of heat and moisture fluxes to the atmosphere, leads absorb solar energy, which is used to melt ice and is transmitting to the underlying ocean. Given that leads dominate the ice-ocean interface in this manner, then it stands to reason that focusing on lead treatments within models can identify performance limitations of models and yield routes for significant improvements.
Author (revised)
Air Sea Ice Interactions; Polynyas; Sea Ice; Environment Simulation; Remote Sensing

20040051075 Geoscience Australia, Canberra, Australia
AusGeo News, No. 73
Wissmann, Julie, Editor; March 2004; ISSN 1035-9338; 26 pp.; In English; Copyright; Avail: Other Sources

This issue articles are: Frontiers in oil province hunt; More gas, less oil in forecast update; Submerged slice of Australia target of sea voyage; Otway source rocks probed for liquids potential; New tool splits petroleum populations; Marine remnants add to Darling Basin history; Mineral exploration expenditure up but Australia#s share down; New maps to aid North West Shelf assessments.
Derived from text
Australia; Crude Oil

44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; and solar, geothermal, windpower, and waterwave conversion systems; energy storage; and traditional power generators. For technologies related to nuclear energy production see *73 Nuclear Physics*. For related information see also *07 Aircraft Propulsion and Power; 20 Spacecraft Propulsion and Power*, and *28 Propellants and Fuels*.

20040050327 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Learning by Doing: The Evolution of State Support for Photovoltaics
Bolinger, M.; Wiser, R.; Jun. 2003; 18 pp.; In English
Report No.(s): DE2004-820258; LBNL-52398; No Copyright; Avail: Department of Energy Information Bridge

Fifteen states have established 'clean energy funds' that will collect more than $3 billion in aggregate from ratepayers over the next decade. The general mission of these funds is to support the development of renewable energy technologies and markets; all of the funds target the installation of photovoltaics (PV) in one way or another. So-called 'buy-down' programs-i.e., programs that offset the high up-front costs of PV through capital grants or rebates-have been the most popular approach taken to date in supporting PV. At present, however, state clean energy funds appear to be evolving into a new phase of supporting PV-one that draws upon lessons learned from the past few years experience with the first round of buy-down programs. This paper briefly discusses these lessons from the past and describes how various states are tweaking, rearranging, or crafting new programs to incorporate those lessons.
NTIS
Photovoltaic Conversion; Renewable Energy; Clean Energy

20040050844 Army Construction Engineering Research Lab., Champaign, IL
Distributed Electrical Power Generation: Summary of Alternative Available Technologies
Scott, Sarah J.; Holcomb, Franklin H.; Josefik, Nicholas M.; Sep. 2003; 82 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): W81EWF-2094-5873
Report No.(s): AD-A421197; ERDC/CERL-SR-03-18; No Copyright; Avail: CASI; A05, Hardcopy

The Federal government is the greatest consumer of electricity in the nation. Federal procurement and installation of higher efficiency energy sources promises many benefits, in terms of economy, employment, export, and environment. While distributed generation (DG) technologies offer many of the benefits of alternative, efficient energy sources, few DG systems can currently be commercially purchased 'off the shelf', and complicated codes and standards deter potential users. Federal use of DG demonstrates the technology, can help drive down costs, and can help lead the general public to accept a changing

energy scheme. This work reviews and describes various distributed generation technologies, including fuel cells, microturbines, wind turbines, photovoltaic arrays, and Stirling engines. Issues such as fuel availability, construction consideration, and protection controls are addressed. Sources of further information are provided.
DTIC
Electric Power Transmission

45
ENVIRONMENT POLLUTION

Includes atmospheric, water, soil, noise, and thermal pollution.

20040045344 NASA Stennis Space Center, Bay Saint Louis, MS, USA
Environmental Assessment for the NASA First Response Facility
Kennedy, Carolyn; October 1, 2003; 20 pp.; In English
Report No.(s): SE-2003-11-00102-SSC; No Copyright; Avail: CASI; A03, Hardcopy

NASA intends to construct a First Response Facility for integrated emergency response and health management. This facility will consolidate the Stennis Space Center fire department, medical clinic, security operations, emergency operations and the energy management and control center. The alternative considered is the 'No Action Alternative'. The proposed action will correct existing operational weaknesses and enhance capabilities to respond to medical emergencies and mitigate any other possible threats. Environmental impacts include are emissions, wetlands disturbance, solid waste generation, and storm water control.
Author
NASA Programs; Environment Management; Public Health; Emergencies

20040046909 Colorado Univ., Boulder, CO, USA
[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face]
Avallone, Linnea M.; [2003]; 6 pp.; In English
Contract(s)/Grant(s): NAG5-11473; No Copyright; Avail: CASI; A02, Hardcopy

An existing closed-path tunable diode laser hygrometer (CLH) was employed for the measurements of total water made during CRYSTAL-FACE. This instrument had flown previously on the NASA DC-8 during the SAGE III Ozone Loss and Validation Experiment (SOLVE) and also on the NCAR C-130 during some local flights designed to test the extent of water vapor interference in carbon dioxide measurements. The instrument was largely unchanged from previous studies, but a new inlet appropriate to the WB-57F wingpod was constructed. In order to minimize the impact on the over-subscribed right wingpod and to achieve good thermal control of the inlet temperature, the CLH inlet was made of carbon-fiber/epoxy composite. Considerable effort was spent to design and build the lightest possible mounting hardware and design relatively low-power inlet heaters. As a result, the instrument and mounting hardware came in below the NASA/JSC-imposed weight cap of 35 lbs. Data were obtained on all test flights during May 2002 and during all but one mission flight in July 2002 (the one lost flight was due to an unplugged instrument power cable). Instrument performance during the test flights was good, but the data are not science- quality, as a variety of tests were performed to optimize the inlet configuration and heating. Data on all mission flights is of high quality, despite some difficulties caused by flying through wet low-altitude air masses and dense anvils, which saturated the instrument response.
Derived from text
Carbon Dioxide; Water Vapor; Measuring Instruments; Inlet Temperature; Fiber Composites

20040046987 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Reducing Indoor Residential Exposures to Outdoor Pollutants
Sherman, M. H.; Matson, N. E.; Jul. 2003; 38 pp.; In English
Report No.(s): DE2003-816774; LBNL-51758; No Copyright; Avail: Department of Energy Information Bridge

The basic strategy for providing indoor air quality in residences is to dilute indoor sources with outdoor air. This strategy assumes that the outdoor air does not have pollutants at harmful levels or that the outdoor air is, at least, less polluted than the indoor air. When this is not the case, different strategies need to be employed to ensure adequate air quality in the indoor environment. These strategies include ventilation systems, filtration and other measures. These strategies can be used for several types of outdoor pollution, including smog, particulates and toxic air pollutants. This report reviews the impacts that typical outdoor air pollutants can have on the indoor environment and provides design and operational guidance for mitigating

them. Poor quality air cannot be used for diluting indoor contaminants, but more generally it can become an indoor contaminant itself. This paper discusses strategies that use the building as protection against potentially hazardous outdoor pollutants, including widespread pollutants, accidental events, and potential attacks.
NTIS
Air Pollution; Pollution; Particulates

20040047005 Geological Survey, Denver, CO
External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99
Gordon, J. D.; Latysh, N. E.; Lindholm, S. L.; 2003; In English
Report No.(s): PB2004-102156; USGS/WRI-03-4027; No Copyright; Avail: National Technical Information Service (NTIS)
Five external quality assurance programs were operated by the U.S. Geological Survey for the National Atmospheric Deposition Program/National Trends Network (NADP/NTN) during 1997 through 1999: the intersite-comparison program, the blind-audit program, the field-audit program, the interlaboratory-comparision program, and the collocated-sampler program. The intersite-comparison program assesses the accuracy of pH and specific-conductance determinations made by NADP/NTN site operators. In two 1997 intersite-comparison studies, 83.7 and 85.8 percent of the pH determinations met the NADP/NTN accuracy goals, whereas 97.3 and 92.4 percent of the specific-conductance determinations met the NADP/NTN accuracy goals. The percentage of pH and specific-conductance determinations that met the accuracy goals in 1998 were, for the most part, higher than in 1997.
NTIS
Atmospheric Composition; Statistical Analysis; Geological Surveys

20040047030 National Inst. of Standards and Technology, Gaithersburg, MD, USA, Environmental Protection Agency, Reston, VA, USA
Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse
Howard-Reed, C.; Wallace, L.; Emmerich, S. J.; 2003; 36 pp.; In English; Prepared in cooperation with Environmental Protection Agency, Reston, VA. National Exposure Research Lab
Report No.(s): PB2004-104191; NISTIR-7068; No Copyright; Avail: CASI; A03, Hardcopy
Several studies have shown the importance of particle losses in real homes due to deposition and filtration; however, none have quantitatively shown the impact of using a central forced air fan and in-duct filter on particle loss rates. In an attempt to provide such data, we measured the deposition of fine and coarse particles following specific source events in an occupied townhouse and also in an unoccupied test house. Experiments were run with three different sources (cooking with a gas stove, citronella candle, pouring kitty litter), with the central heating and air conditioning (HAC) fan on or off, and with two different types of in-duct filters (electrostatic precipitator and ordinary furnace filter). These tests resulted in a database of deposition rates for particles ranging from 0.3 micrometers to 10 micrometers under a wide range of occupancy conditions. Particle size, HAC fan operation, and the electrostatic precipitator had significant effects on particle loss rates. The standard furnace filter had no effect on loss rates. Surprisingly, the type of source (combustion vs. mechanical generation) and the type of furnishings (fully furnished including carpet vs. largely unfurnished including mostly bare floor) also had no measurable effect on the deposition rates of particles of comparable size.
NTIS
Electrostatic Precipitators; Combustion; Data Bases

20040047073 California Univ., Los Angeles, CA, USA
Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California
Shendell, D. G.; 2003; 452 pp.; In English
Report No.(s): DE2003-816588; No Copyright; Avail: Department of Energy Information Bridge
The prevalence of prefabricated, portable classrooms (portables, relocatables, RCs) has increased due to class size reduction initiatives and limited resources. Classroom mechanical wall-mount heating, ventilation, and air conditioning (HVAC) systems may function improperly or not be maintained; lower ventilation rates may impact indoor air and environmental quality (IEQ). Materials in portables may off-gas volatile organic compounds (VOCs), including formaldehyde, as a function of age, temperature, and humidity. For a pilot study, public K-12 schools located in or serving target areas within

five Los Angeles County communities were identified. In two communities where school districts (SD) consented, 1-3 randomly selected portables, one newer and one older, and one main building control classroom from each participating school were included. Sampling was conducted over a five-day school week in the cooling and heating seasons, or repeated twice in the cooling season. Measurements included passive samplers for VOCs, formaldehyde and acetaldehyde, and air exchange rate (AER) calculation; indoor air temperature and humidity; technician walk-through surveys; an interview questionnaire above HVAC system operation and maintenance (O and M). For an intervention study evaluating advanced HVAC technologies in comparison to the common conventional technology, and materials for source reduction of VOCs, four RC were manufactured and located in pairs at two schools in two recruited Northern California SD in different climate zones. RCs were built with the two HVAC systems, cabinetry and conduit for monitoring equipment, and standard or advanced interior finish materials. Each RC was its own control in a case-crossover design--HVAC systems alternately operated for 1-2 week intervals in the 2001-02 school year, with IEQ monitoring including aldehyde and indoor air temperature and humidity data. Measured classroom AER were low, formaldehyde concentrations were below the state indoor air guideline 'target level', and concentrations of most target VOCs were low. O and M questionnaire results suggested insufficient training and communication between custodians and SD offices concerning HVAC systems. Future studies should attempt larger sample sizes and cover larger geographical areas but continue to assess multiple IEQ parameters during occupied hours. Teachers, custodians, and SD staff must be educated on the importance of adequate ventilation with filtered outdoor air.
NTIS
Air Quality; Air Conditioning; Atmospheric Temperature; Environmental Quality

20040047083 Westinghouse Savannah River Co., Aiken, SC, USA
Evaluation of Proposed New LLW Disposal Activity: Disposal of Aqueous PUREX Waste Stream in the Saltstone Disposal Facility
Cook, J. R.; Apr. 2003; 22 pp.; In English
Report No.(s): DE2003-816343; WSRC-RP-2003-00370; No Copyright; Avail: Department of Energy Information Bridge

The Aqueous PUREX waste stream from Tanks 33 and 35, which have been blended in Tank 34, has been identified for possible processing through the Saltstone Processing Facility for disposal in the Saltstone Disposal Facility. Other options include blending the Aqueous PUREX waste stream with DWPF Recycle waste in Tank 23, blending the Aqueous PUREX waste stream with the solid and liquid material currently in Tank 50, and blending the Aqueous PUREX waste stream with the contents of both Tank 23 and Tank 50. Characterization data from the individual waste streams are used to compare the Saltstone feed material resulting from each option to the disposal limits calculated in the Saltstone Special Analysis.
NTIS
Waste Water; Radioactive Wastes; Radioactive Isotopes

20040047184 Lawrence Livermore National Lab., Livermore, CA, USA
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation
Chuang, Catherine C.; Penner, Joyce E.; September 1994; 8 pp.; In English; 75th AMS Annual Meeting, 15-20 Jan. 1995, Dallas, TX, USA
Contract(s)/Grant(s): W-7405-eng-48; NAGW-1287
Report No.(s): UCRL-JC-118559; Conf-950124-2; No Copyright; Avail: CASI; A02, Hardcopy

The characteristics of the cloud drop size distribution near cloud base are initially determined by the aerosol particles that serve as CCN and by the local updraft velocity. Chemical reactions of the emitted gaseous sulfur compounds due to human activities will alter, through gas-to-particle conversion, the aerosol size distribution, total number, and its chemical composition. Recently, Boucher and Rodhe and Jones et.al have each developed parameterizations relating cloud drop concentration to sulfate mass or aerosol number concentration, respectively, and used them to develop estimates of the indirect forcing by anthropogenic sulfate aerosols. THese parameterizations made use of measure relationships in continental and maritime clouds. However, these relationships are inherently noisy, yielding more than a factor of 2 variation in cloud drop concentration for a given aerosol number (or for a given sulfate mass) concentration. The large spatial and temporal variabilities in the concentration, chemical characteristics, and size distribution of aerosols have made it difficult to develop such a parameterization from data. In this paper, our focus is to develop a means for relating the predicted anthropogenic sulfate mass to cloud drop number concentration over the range of expected conditions associated with continental and marine aerosol. We start with an assumed pre-existing particle size distribution and develop an approximation of the altered distribution after addition of anthropogenic sulfate. We thereby develop a conservative estimate of the possible change in cloud drop number concentration due to anthropogenic sulfate.
Derived from text
Sulfur Compounds; Drop Size; Clouds (Meteorology); Aerosols; Chemical Reactions; Nucleation

20040050188 National Renewable Energy Lab., Golden, CO, Battelle Columbus Labs., OH, USA
Challenges and Experiences with Electric Propulsion Transit Buses in the USA
Eudy, L.; Gifford, M.; Nov. 2003; 40 pp.; In English
Report No.(s): DE2004-15005817; DOE/GO-102003-1791; No Copyright; Avail: Department of Energy Information Bridge
Document provides background for transit agencies and fleets that are considering electric propulsion technologies. It tells them what to expect and plan for when implementing vehicles with electric propulsion systems.
NTIS
Propulsion System Configurations; Propulsion System Performance

20040050202 Lawrence Livermore National Lab., Livermore, CA
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California
Beller, H. R.; Dooher, B. P.; Hall, L. C.; Layton, D. W.; Marchetti, A. A.; Sep. 2003; 52 pp.; In English
Report No.(s): DE2004-15005890; UCRL-LR-155209; No Copyright; Avail: Department of Energy Information Bridge
California Senate Bill 529 requires the California Environmental Policy Council to identify and evaluate all significant beneficial and adverse impacts on the environment that may result from any fuel specification proposed or established by the California Air Resources Board (CARB); this requirement includes impacts associated with the production, use, and disposal of the compound or compounds that may be used to meet the fuel specification. Additionally, California Senate Bill 989 prohibits the CARB from adopting new fuel specifications until a 'multimedia' evaluation has been performed and submitted to the California Environmental Policy Council for final review and approval. The California State Water Resources Control Board (SWRCB) is concerned with the lifecycle impacts that any new fuels may have on, and beneficial uses of, surface water and groundwater in California. In the case of PuriNOx, the SWRCB needs information that will allow an informed decision to be made regarding the relative risk of PuriNOx to California water resources and beneficial uses as compared to ultra-low sulfur diesel (ULSD). The SWRCB has made a good-faith effort to identify all of the information that may be needed and has provided this guidance to Lubrizol.
NTIS
Environment Management; Fuels; Surface Water

20040050312 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA, Aerosol Dynamics, Inc., Berkeley, CA, USA
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon
Thatcher, T. L.; Lunden, M. M.; Sextro, R. G.; Hering, S.; Brown, N. J.; 2003; 10 pp.; In English
Report No.(s): DE2004-820649; No Copyright; Avail: Department of Energy Information Bridge
Indoor exposure to particles of outdoor origin constitutes an important exposure pathway. We conducted an intensive set of indoor particle measurements in an unoccupied house under differing operating conditions. Real-time measurements were conducted both indoors and outdoors, including PM2.5 nitrate, sulfate, and carbon. Because the time-scale of the fluctuations in outdoor particle concentrations and meteorological conditions are often similar to the time constant for building air exchange, a steady state concentration may never be reached. The time-series experimental data were used to determine the effect of changes in air exchange rate and indoor/outdoor temperature and relative humidity differences on indoor particle concentrations. A multivariate regression was performed to investigate the difference between measured indoor concentrations and results from a simple time-dependent physical model. Environmental conditions had a significant effect on indoor concentrations of all three PM2.5 species, but did not explain all of the model variation.
NTIS
Deposition; Exposure; Nitrates; Sulfates; Carbon

20040050406 Arizona Univ., Tucson, AZ
NOx, Fine Particle and Toxic Metal Emissions from the Combustion of Sewage Sludge/Coal Mixtures: A Systematic Assessment
Wendt, J. O. L.; Jan. 2003; 16 pp.; In English
Report No.(s): DE2004-820750; No Copyright; Avail: Department of Energy Information Bridge
This research project focuses on pollutants from the combustion of mixtures of dried municipal sewage sludge (MSS) and coal. The objective is to determine the relationship between (1) fraction sludge in the sludge/coal mixture, and (2) combustion

conditions on (a) NOx concentrations in the exhaust, (b) the size segregated fine and ultra-fine particle composition in the exhaust, and (c) the partitioning of toxic metals between vapor and condenses phases, within the process. The proposed study will be conducted in concert with an existing ongoing research on toxic metal partitioning mechanisms for very well characterized pulverized coals alone. Both high NOx and low NOx combustion conditions will be investigated (unstaged and staged combustion). Tradeoffs between CO(sub 2) control, NO(sub x) control, and inorganic fine particle and toxic metal emissions will be determined.
NTIS
Combustion; Nitrogen Oxides; Toxicity

20040050409 West Virginia Univ., Morgantown, WV, USA, West Virginia Research Corp., Morgantown, WV
Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry
Manivannan, A.; Seehra, M. S.; Sep. 2002; 14 pp.; In English
Report No.(s): DE2004-821152; No Copyright; Avail: Department of Energy Information Bridge

In this project, we have attempted to develop a new technique utilizing Boron-doped diamond (BDD) films to electrochemically detect mercury dissolved in solution via the initial deposition of metallic mercury, followed by anodic linear sweep voltammetry in the range from 10-10(sup -10) M to 10(sup -5) M. Cyclic voltammetry (CV) and differential pulse voltammetry (DPV) techniques were employed. The extremely low background current for BDD electrodes compared to glassy carbon (GC) provides a strong advantage in trace metal detection. CV peak currents showed good linearity in the micromolar range. A detection level of 6.8 x 10(sup -10) M was achieved with DPV in 0.1 M KNO(sub 3) (pH= 1) for a deposition time of 20 minutes. Reproducible stripping peaks were obtained, even for the low concentration range. A comparison with GC shows that BDD is superior. Linear behavior was also obtained in the mercury concentration range from 10(sup -10) M to 10(sup -9) M.
NTIS
Electrochemistry; Flue Gases; Doped Crystals

46
GEOPHYSICS

Includes Earth structure and dynamics, aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For related information see *47 Meteorology and Climatology*; and *93 Space Radiation*.

20040045250
New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma
Chappell, Charles R.; October 2003; 2 pp.; In English
Contract(s)/Grant(s): NAG5-9565; No Copyright; Avail: CASI; A01, Hardcopy

The unique instrumentation on the Polar satellite combined with the simultaneous measurement of different parts of the magnetosphere with multiple satellites make possible the study of magnetospheric processes in a special way. In particular, the study of the ionospheric supply of plasma to the magnetosphere can by accomplished to give important results on the plasmas which drive the dynamics of the magnetosphere. This study concentrated on the period of September to December, 2001 in which the Polar orbit had precessed to the point that the line of apsides was near the equatorial plane. This unique orbital configuration enabled the TIDE instrument to measure outflowing ions across the polar cap and then transit the magnetotail lobes and observe the dramatic change in plasma characteristics as the satellite entered the plasma sheet. Contact was made with investigators on the Cluster and Geotail satellite missions and corresponding time frames were studied in the data. There were two approximate conjunctions between Polar and Geotail and data were compared to look for features which might be related. The higher energy concentration of the Geotail instrument made direct comparisons with TIDE difficult, and the Cluster measurements did not surface any cases that corresponded closely in space and time. There were, however, many interesting aspects of the Polar orbits which permitted the observation of the changing ionospheric outflowing plasma characteristics. As in earlier measurements, the ionospheric plasma could be seen flowing up the magnetic field lines out of the northern and southern polar caps. Its energy suggested a polar wind origin energized by the centrifugal acceleration of flow through the polar cusp. The roughly 10eV ions then moved out into the lobes of the magnetotail where they could be seen flowing toward the plasma sheet in both the northern and southern magnetotail lobes. There was also a double field-aligned region of warm ions observed just outside the plasmasphere, stretching toward the auroral zone and inner plasma sheet boundary. Upon entering the plasma sheet, the plasma energy jumped from 10 s of eV to greater than 1 keV. The single field aligned flows transitioned to highly variable spatially choppy energized ion distributions with a variety of pitch angle

configurations. This pattern was quite repeatable in all of the Polar orbits that were examined and are compatible with the source of ions being the polar wind which is then energized to 10 s of eV by the centrifugal acceleration. These modestly energized polar wind ions are then carried to the magnetotail where they are substantially energized by the curvature drift-induced movement across the cross-tail potential of the magnetotail. This latter drift energizes the ions to the energies typically found in the plasma sheet. Subsequent drift and energization can cause the ions to become part of the ring current. The results of this study were presented at the Spring AGU meeting in 2002 and the GEM meeting in June 2003. They are the foundation for a paper that has been submitted by Matthew Huddleston to the Journal of Geophysical Research in December 2003. This work was part of the thesis that Matthew completed in finishing his Ph.D. in Physics at Vanderbilt University.
Author
Ionospheres; Geophysics; Solar Maximum Mission; Solar Physics; Plasmas (Physics)

20040046900 Missouri Univ., Columbia, MO, USA
Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study
Liu, Mian; Stein, Seth; [2003]; 3 pp.; In English
Contract(s)/Grant(s): NAG5-10306
Report No.(s): SENSH99-0060-0029; No Copyright; Avail: CASI; A01, Hardcopy

The main objective of this project was to better understand the geodynamics controlling the mountain building and topographic evolution in the central Andes using an integrated approach that combines GPS, seismological, and numerical studies.
Author
Geodynamics; Topography; Mountains; Evolution (Development)

20040047249 NASA Marshall Space Flight Center, Huntsville, AL, USA
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm
Khazanov, G. V.; Gamayunov, K. V.; Jordanova, V. K.; Journal of Geophysical Research; 2003; ISSN 0148-0227; Volume 108, No. A12, pp. 5-1 - 5-18; In English
Contract(s)/Grant(s): NAG5-6976; NSF ATM-98-00830; NSF ATM-01-01095; Copyright; Avail: Other Sources

A complete description of a self-consistent model of magnetospheric ring current interacting with electromagnetic ion cyclotron waves is presented. The model is based on the system of two kinetic equations; one equation describes the ring current ion dynamics, and another equation describes the wave evolution. The effects on ring current ions interacting with electromagnetic ion cyclotron waves and back on waves are considered self-consistently by solving both equations on a global magnetospheric scale under nonsteady state conditions. The developed model is employed to simulate the entire 2-7 May 1998 storm period. First, the trapped number fluxes of the ring current protons are calculated and presented along with comparison with the data measured by the three- dimensional hot plasma instrument Polar/HYDRA. Incorporating in the model the wave-particle interaction leads to much better agreement between the experimental data and the model results. Second, examining of the wave (MLT, L shell) distributions produced by the model during the storm progress reveals an essential intensification of the wave emission about 2 days after the main phase of the storm. This result is well consistent with the earlier ground-based observations. Finally, the theoretical shapes and the occurrence rates of the wave power spectral densities are studied. It is found that about 2 days after the storm s main phase on 4 May, mainly non-Gaussian shapes of power spectral densities are produced.
Author
Ion Cyclotron Radiation; Ring Currents; Self Consistent Fields; Electromagnetic Radiation; Mathematical Models; Magnetic Storms

20040050291 NASA Marshall Space Flight Center, Huntsville, AL, USA
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation
Nishikawa, K.-I.; Yan, X. Y.; Cai, D. S.; Lembege, B.; [2004]; 1 pp.; In English; Explosive Phenomena in Magnetized Plasma: New Development of Reconnection Research, 17-19 Mar. 2004, Kyoto, Japan; No Copyright; Avail: Other Sources; Abstract Only

We report our new simulation results on magnetospheric magnetic reconnection with southward IMF using a 3D EMPM model, with greater resolution and more particles using the parallelized 3D HPF TRISTAN code on VPP5000 supercomputer.

Main parameters used in the new simulation are: domain size is 215 x 145 x 145, grid size = 0.5 Earth radius, initial particle number is 16 per cell, the IMF is southward. Arrival of southward IMF will cause reconnection in the magnetopause, thus allowing particles to enter into the inner magnetosphere. Sunward and tailward high particle flow are observed by satellites, and these phenomena are also observed in the simulation near the neutral line (X line) of the near-Earth magnetotail. This high particle flow goes along with the reconnected island. The magnetic reconnection process contributes to direct plasma entry between the magnetosheath to the inner magnetosphere and plasma sheet, in which the entry process eats the magnetosheath plasma to plasma sheet temperatures. We investigate magnetic, electric fields, density, and current during this magnetic reconnection with southward IMF. Further investigation with this simulation will provide insight into unsolved problems, such as the triggering of storms and substorms, and the storm-substorm relationship. New results will be presented at the meeting.
Author
Magnetic Field Reconnection; Magnetospheres; Interplanetary Magnetic Fields; Three Dimensional Models; Computerized Simulation

20040050553 Mission Research Corp., USA
Solar Wind/Magnetosphere/Ionosphere Coupling and the Temporal and Spatial Evolution of Boundary Layers using Cluster, Polar and other ISTP Satellites
Maynard, Nelson C.; [2004]; 3 pp.; In English
Contract(s)/Grant(s): NASW-02017; No Copyright; Avail: CASI; A01, Hardcopy

Our analysis concerns macro and meso-scale aspects of coupling between the IMF and the magnetosphere-ionosphere system, as opposed to the microphysics of determining how electron gyrotropy is broken and merging actually occurs. We correlate observed behaviors at Cluster and at Polar with temporal variations in other regions, such as in the ionosphere as measured by SuperDARN. Addressing problems with simultaneous observations from diverse locations properly constrains our interpretations.
Author
Solar Wind; Magnetosphere-Ionosphere Coupling

20040050671 Spectral Sciences, Inc., Burlington, MA
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator
Shroll, Robert M.; Adler-Golden, Steven; Duff, James W.; Brown, James H.; Oct. 14, 2003; 60 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): F19628-98-C-0050; Proj-6403; Proj-3352
Report No.(s): AD-A420940; SSI-TR-399; AFRL-VS-TR-2003-1530; No Copyright; Avail: CASI; A04, Hardcopy

The SHARC Atmosphere Generator (SAG) is a stand- alone, interactive program that utilizes a combination of empirical models to generate atmospheric profiles for Air Force IR radiation codes that account for systematic variability of the atmosphere, including solar terminator effects. Using information on the day of the year, local time, solar and geomagnetic activity indices, etc., SAG reasonably models the variabilities in temperature and CO2, O3, OH, NO3, H2O and O densities. For other species, diurnally averaged profiles are derived from recent climatology databases or other standard tabulations. The SAG output files support SHARC, SAMM, and MODTRAN.
DTIC
Atmospheric Physics; Data Bases; Manuals; User Manuals (Computer Programs)

20040050795 Boston Coll., Chestnut Hill, MA
Validation of Ionospheric Models
Doherty, Patricia H.; McNamara, Leo F.; Delay, Susan H.; Grossbard, Neil J.; Sep. 18, 2003; 212 pp.; In English
Contract(s)/Grant(s): F19628-96-C-0039; Proj-1010
Report No.(s): AD-A421129; AFRL-VS-TR-2003-1610; No Copyright; Avail: CASI; A10, Hardcopy

This contract was entitled Validation of Ionospheric Models. The objective of this contract was to obtain satellite and ground-based ionospheric measurements from a wide range of geographic locations and to utilize the resulting databases to validate the theoretical ionospheric models that are the basis of the Parameterized Real-time ionospheric Specification Model (PRISM) and the Ionospheric Forecast Model (IFM). Thus our various efforts can be categorized as either observational databases or modeling studies.
DTIC
Atmospheric Models; Earth Ionosphere

20040050920 Naval Research Lab., Washington, DC
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring
Werner, Juliane M.; Evans, Thomas W.; Rose-Pehrsson, Susan L.; Hammond, Mark H.; Feb. 27, 2004; 23 pp.; In English
Report No.(s): AD-A421121; NRL/MR/6110-04-8753; No Copyright; Avail: CASI; A03, Hardcopy

Drager tubes are currently used to supplement the atmosphere analysis measurements made aboard US Navy submarines. The submarine fleet has requested that these tubes be replaced with a less labor intensive measurement system. Due to recent developments in gas sensing instrumentation, it is possible to replace many of the existing detectors with instruments that will incorporate more than one sensor at a time. This report is a continuation of an evaluation of portable instruments for use in submarines as air monitors. This is the second phase of a three-phase program concerned with investigating potential detection methods to replace the Drager tubes. The sensors being evaluated in phase two are carbon dioxide (CO2), hydrogen cyanide (HCN), hydrogen chloride (HCl), and broad range hydrocarbons (BRH). In this phase, the Drager Multiwarn II and the Enmet Omni 4000 demonstrate good performance for the detection of CO2 and HCN. The poor performance and accuracy of the HCl and BRH sensors results are shown. Further investigations are needed to find suitable detection methods for HCl and BRH. DTIC
Air Quality; Carbon Dioxide; Controlled Atmospheres; Environmental Monitoring

47
METEOROLOGY AND CLIMATOLOGY

Includes weather observation forecasting and modification.

20040045267 NASA Ames Research Center, Moffett Field, CA, USA
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP
Strawa, A. W.; Ricci, K.; Provencal, R.; Schmid, B.; Covert, D.; Elleman, R.; Arnott, P.; [2003]; 1 pp.; In English; DOE Aerosol Working Group, 15-17 Dec. 2003, Sonoma, CA, USA; No Copyright; Avail: CASI; A01, Hardcopy

Large uncertainties in the effects of aerosols on climate require improved in-situ measurements of extinction coefficient and single-scattering albedo. This paper describes preliminary results from Cadenza, a new continuous wave cavity ring-down (CW-CRD) instrument designed to address these uncertainties. Cadenza measures the aerosol extinction coefficient for 675 nm and 1550 nm light, and simultaneously measures the scattering coefficient at 675 nm. In the past year Cadenza was deployed in the Asian Dust Above Monterey (ADAM) and DOE Aerosol Intensive Operating Period (IOP) field projects. During these flights Cadenza produced measurements of aerosol extinction in the range from 0.2 to 300 Mm-1 with an estimated precision of 0.1 Min-1 for 1550 nm light and 0.2 Mm-1 for 675 nm light. Cadenza data from the ADAM and Aerosol IOP missions compared favorably with data from the other instruments aboard the CIRPAS Twin Otter aircraft and participating in those projects.= We present comparisons between the Cadenza measurements and those friom a TSI nephelometer, Particle Soot Absorption Photometer (PSAP), and the AATS 14 sun-photometer. Measurements of the optical properties of smoke and dust plumes sampled during these campaigns are presented and estimates of heating rates due to these plumes are made.
Author
Aerosols; Extinction; Scattering; Continuous Radiation; Albedo

20040045305 NASA Goddard Space Flight Center, Greenbelt, MD, USA
TRMM Data from the Goddard Earth Sciences (GES) DISC DAAC: Tropical Rainfall Measuring Mission (TRMM)
[2003]; 6 pp.; In English; ASPRS
Report No.(s): NASA/NP-1998-12-074-GSFC; No Copyright; Avail: CASI; A02, Hardcopy

Tropical rainfall affects the lives and economies of a majority of the Earth's population. Tropical rain systems, such as hurricanes, typhoons, and monsoons, are crucial to sustaining the livelihoods of those living in the tropics. Excess rainfall can cause floods and great property and crop damage, whereas too little rainfall can cause drought and crop failure. The latent heat release during the process of precipitation is a major source of energy that drives the atmospheric circulation. This latent heat can intensify weather systems, affecting weather thousands of kilometers away, thus making tropical rainfall an important indicator of atmospheric circulation and short-term climate change. The Tropical Rainfall Measuring Mission (TRMM), jointly sponsored by the National Aeronautics and Space Administration (NASA) of the USA and the National Space Development Agency (NASDA) of Japan, provides visible, infrared, and microwave observations of tropical and subtropical rain systems. The satellite observations are complemented by ground radar and rain gauge measurements to validate satellite rain estimation techniques. Goddard Space Flight Center's involvement includes the observatory, four instruments, integration and testing of the observatory, data processing and distribution, and satellite operations. TRMM has a design lifetime of three

years. It is currently in its fifth year of operation. Data generated from TRMM and archived at the GES DAAC are useful not only for hydrologists, atmospheric scientists, and climatologists, but also for the health community studying infectious diseases, the ocean research community, and the agricultural community.
Derived from text
Trmm Satellite; Satellite-Borne Instruments; Data Systems

20040046877 Meteorological Satellite Center, Kiyose, Japan
Monthly Report of the Meteorological Satellite Center: December 2003
December 2003; In English; In Japanese; Document files and Satellite data are recorded in either ASCII or shift JIS code; Full Disk Earth's Cloud Images are recorded in Bit-Map (BMP) format; Copyright; Avail: Other Sources

The CD-ROM concerning the December 2003 Monthly Report of the Meteorological Satellite Center (MSC) contains the observation data derived from the Geostationary Meteorological Satellite (GMS) of Japan and the Polar Orbital Meteorological Satellites operated by NOAA. The CD-ROM contains the following observation data: Full Disk Earth's Cloud Image; Cloud Image of Japan and its vicinity; Cloud Amount; Sea Surface Temperature; Cloud Motion Wind; Water Vapor Motion Wind; Equivalent Blackbody Temperature; OLR (Out-going Longwave Radiation), Solar Radiation; Snow and Ice Index; Orbit Data; Attitude Data; VISSR Image Data Catalog (Cartridge Magnetic Tape (CMT), Micro Film); TOVS (TIROS Operational Vertical Sounder) Vertical Profile of Temperature and Precipitable Water; and TOVS Total Ozone Amount.
Author
Satellite Observation; Satellite Sounding; Atmospheric Sounding; Meteorological Parameters; Satellite Imagery; Japan

20040046879 Texas Univ., Austin, TX, USA
Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System
[2003]; 26 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): NAG5-6309; No Copyright; Avail: CASI; A03, Hardcopy

The objective of this investigation has been to examine the mass and momentum exchange between the atmosphere, oceans, solid Earth, hydrosphere, and cryosphere. The investigation has focused on changes in the Earth's gravity field, its rotation rate, atmospheric and oceanic circulation, global sea level change, ice sheet change, and global ground water circulation observed by contemporary sensors and models. The primary component of the mass exchange is water. The geodetic observables provided by these satellite sensors are used to study the transport of water mass in the hydrological cycle from one component of the Earth to another, and they are also used to evaluate the accuracy of models. As such, the investigation is concerned with the overall global water cycle. This report provides a description of scientific, educational and programmatic activities conducted during the period July 1, 1999 through June 30,2000. Research has continued into measurements of time-varying gravity and its relationship to Earth rotation. Variability of angular momentum and the related excitation of polar motion and Earth rotation have been examined for the atmosphere and oceans at time-scales of weeks to several years. To assess the performance of hydrologic models, we have compared geodetic signals derived from them with those observed by satellites. One key component is the interannual mass variability of the oceans obtained by direct observations from altimetry after removing steric signals. Further studies have been conducted on the steric model to quantify its accuracy at global and basin-scales. The results suggest a significant loss of water mass from the Oceans to the land on time-scales longer than 1-year. These signals are not reproduced in any of the models, which have poorly determined interannual fresh water fluxes. Output from a coupled atmosphere-ocean model testing long-term climate change hypotheses has been compared to simulated errors from the Gravity Recovery and Climate Experiment (GRACE) mission. Results indicate that GRACE will be able to observe seasonal signals at half-wavelengths ranging from 1000 to 10000 km, and may be able to observe secular trends at half- wavelengths of greater than 2000-3000 km for soil moisture and snow depth if they are as large as some of the climate experiments predict.
Author
Angular Momentum; Earth Observing System (Eos); Earth Gravitation; Earth Hydrosphere; Polar Wandering (Geology); Earth Rotation

20040046886 Smithsonian Tropical Research Inst., Balboa, Panama, Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil
Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass
Laurance, William F.; [2004]; 10 pp.; In English
Contract(s)/Grant(s): NCC5-290; No Copyright; Avail: CASI; A02, Hardcopy

This project was focused on assessing the effects of prevailing land uses, such as habitat fragmentation, selective logging, and fire, on biomass and carbon storage in Amazonian forests, and on the dynamics of carbon sequestration in regenerating forests. Ancillary goals included developing GIs models to help predict the future condition of Amazonian forests, and assessing the effects of anthropogenic climate change and ENS0 droughts on intact and fragmented forests. Ground-based studies using networks of permanent plots were linked with remote-sensing data (including Landsat TM and AVHRR) at regional scales, and higher-resolution techniques (IKONOS imagery, videography, LIDAR, aerial photographs) at landscape and local scales. The project s specific goals were quite eclectic and included: Determining the effects of habitat fragmentation on forest dynamics, floristic composition, and the various components of above- and below-ground biomass. Assessing historical and physical factors that affect trajectories of forest regeneration and carbon sequestration on abandoned lands. Extrapolating results from local studies of biomass dynamics in fragmented and regenerating forests to landscape and regional scales in Amazonia, using remote sensing and GIS. Testing the hypothesis that intact Amazonian forests are functioning as a significant carbon sink. Examining destructive synergisms between forest fragmentation and fire. Assessing the short-term impacts of selective logging on aboveground biomass. Developing GIS models that integrate current spatial data on forest cover, deforestation, logging, mining, highway and roads, navigable rivers, vulnerability to wild fires, protected areas, and existing and planned infrastructure projects, in an effort to predict the future condition of Brazilian Amazonian forests over the next 20-25 years. Devising predictive spatial models to assess the influence of varied biophysical and anthropogenic predictors on Amazonian deforestation.
Author
Amazon Region (South America); Biomass; Anthropology; Biophysics; Climate Change; Environment Effects

20040046904 California Univ., San Diego, La Jolla, CA, USA
[CO2 Budget and Atmospheric Rectification (COBRA) Over North America]
[2004]; 3 pp.; In English
Contract(s)/Grant(s): NAG5-7637; No Copyright; Avail: CASI; A01, Hardcopy

The purpose of the CO2 Budget and Rectification Airborne (COBRA) study was to assess terrestrial sources and sinks of carbon dioxide using an air-borne study. The study was designed to address the measurement gap between plot-scale direct flux measurements and background hemispheric-scale constraints and to refine techniques for measuring terrestrial fluxes at regional to continental scales. The initial funded effort (reported on here) was to involve two air-borne campaigns over North America, one in summer and one in winter. Measurements for COBRA (given the acronym C02BAR in the initial proposal) were conducted from the University of North Dakota Citation 11, a twin-engine jet aircraft capable of profiling from the surface to 12 km and cruising for up to 4 hours and 175m/s. Onboard instrumentation measured concentrations of CO2, CO, and H2O, and meteorological parameters at high rates. In addition, two separate flask sampling systems collected discrete samples for laboratory analysis of CO2,CO, CH4, N2O, SF6, H2, 13CO2, C18O16O,O2/N2, and Ar/N2. The project involved a collaboration between a number of institutions, including (but not limited to) Harvard, NOAA-CMDL, the University of North Dakota, and Scripps.
Author
Carbon Dioxide; Meteorological Parameters; Nitrogen Oxides; Methane

20040046929 Catholic Univ. of America, Washington, DC, USA
Cone Model for Halo CMEs: Application to Space Weather Forecasting
Xie, Hong; Ofman, Leon; Lawrence, Gareth; Journal of Geophysical Research; 2004; ISSN 0148-0227; Volume 109; 13 pp.; In English
Contract(s)/Grant(s): NAG5-9490; NSF ATM-02-07588; NAG5-4940; Copyright; Avail: Other Sources

In this study, we present an innovative analytical method to determine the angular width and propagation orientation of halo Coronal Mass Ejections (CMEs). The relation of CME actual speed with apparent speed and its components measured at different position angle has been investigated. The present work is based on the cone model proposed by Zhao et al. We have improved this model by: (1) eliminating the ambiguity via a new analytical approach, (2) using direct measurements of projection onto the plane of the sky (POS), and (3) determining the actual radial speeds from projection speeds at different position angles to clarify the uncertainty of projection speeds in previous empirical models. Our analytical approach allows us to use coronagraph data to determine accurately the geometrical features of POS projections, such as major axis, minor axis, and the displacement of the center of its projection, and to determine the angular width and orientation of a given halo CME. Our approach allows for the first time the determination of the actual CME speed, width, and source location by using coronagraph data quantitatively and consistently. The method greatly enhances the accuracy of the derived geometrical and

kinematical properties of halo CMEs, and can be used to optimize Space Weather forecasts. The applied model predications are in good agreement with observations.
Author
Cones; Weather Forecasting; Space Weather; Magnetic Clouds; Halos; Coronal Mass Ejection; Atmospheric Models

20040046968 Lawrence Livermore National Lab., Livermore, CA
INCCA: Integrated Climate and Carbon
Thompson, S. L.; Mar. 13, 2001; 52 pp.; In English
Report No.(s): DE2004-15005710; UCRL-ID-143593; No Copyright; Avail: Department of Energy Information Bridge

The INCCA (Integrated Climate and Carbon) initiative will develop and apply the ability to simulate the fate and climate impact of fossil fuel-derived carbon dioxide (CO(sub 2)) and aerosols on a global scale. Coupled climate and carbon cycle modeling like that proposed for INCCA is required to understand and predict the future environmental impacts of fossil fuel burning. At present, atmospheric CO(sub 2) concentrations are prescribed, not simulated, in large climate models. Credible simulations of the entire climate system, however, need to predict time-evolving atmospheric greenhouse forcing using anthropogenic emissions as the fundamental input. Predicting atmospheric COS concentrations represents a substantial scientific advance because there are large natural sources and sinks of carbon that are likely to change as a result of climate change. Both terrestrial (e.g., vegetation on land) and oceanic components of the carbon cycle are known to be sensitive to climate change. Estimates of the amount of man-made CO(sub 2) that will accumulate in the atmosphere depend on understanding the carbon cycle. For this reason, models that use CO(sub 2) emissions, not prescribed atmospheric concentrations, as fundamental inputs are required to directly address greenhouse-related questions of interest to policymakers. INCCA is uniquely positioned to make rapid progress in this high-priority area of global change modeling and prediction because we can leverage previous and ongoing LLNL developments, and use existing component models that are well-developed and published.
NTIS
Carbon Dioxide; Aerosols; Climate

20040047091 Helsinki Univ. of Technology, Espoo
Modeling of Microscale Variations in Methane Fluxes
Kettunen, A.; Nov. 2002; 44 pp.; In English
Report No.(s): PB2004-104409; Copyright; Avail: National Technical Information Service (NTIS)

The current study analyzes the different modes of variation in methane fluxes from different microsites of a boreal mire. The results emphasize the importance of microsite characteristics, water table and vegetation cover for methane fluxes. Water level affects the moisture and oxygen profiles in peat matrix which are reflected to methane production and oxidation rates and the corresponding microbial populations. Vascular plants promote methane production by providing substrates in the form of root exudates and fine root litter, enhance methane oxidation by transporting oxygen to water saturated peat layers and accelerate methane transport by liberating methane from peat to the atmosphere via the aerenchymous tissue. The model presented in this study connects the methane fluxes to the seasonal photosynthetic cycle of plants at the microsite level while the thermal and hydrological conditions in peat are used as an operational framework. Overall, the model dynamically combines the microbial processes in peat to changing environmental factors in the level of peatland ecosystem. Sensitivity analysis of the model reveals the importance of substrate supply to methane fluxes. Furthermore, the model outcome is sensitive to increased capability of the vascular plants to transport oxygen downwards. Lack of oxygen and partly methane keep methane oxidation at a very low level. Any changes in model parameters or environmental conditions that compensate for these lacks have a remarkable decreasing effect on simulated flux. Simulated methane flux decreases considerably if the duration of simulated dry period increases, threshold for a dramatic change lying between 4 and 6 weeks of drought. Increase in air temperature enhances methane flux especially if the effect of increased temperature on gross primary production is taken into account.
NTIS
Methane; Peat; Moisture; Oxygen

20040047196 Alabama Univ., Huntsville, AL, USA
Global Lightning Activity
Christian, Hugh J.; February 10, 2004; 1 pp.; In English; University of Mexico Presentation, 14-20 Mar. 2004, Mexico City, Mexico; No Copyright; Avail: Other Sources; Abstract Only

Our knowledge of the global distribution of lightning has improved dramatically since the advent of spacebased lightning observations. Of major importance was the 1995 launch of the Optical Transient Detector (OTD), followed in 1997 by the launch of the Lightning Imaging Sensor (LIS). Together, these instruments have generated a continuous eight-year record of global lightning activity. These lightning observations have provided a new global perspective on total lightning activity. For the first time, total lightning activity (cloud-to-ground and intra-cloud) has been observed over large regions with high detection efficiency and accurate geographic location. This has produced new insights into lightning distributions, times of occurrence and variability. It has produced a revised global flash rate estimate (44 flashes per second) and has lead to a new realization of the significance of total lightning activity in severe weather. Accurate flash rate estimates are now available over large areas of the earth (+/- 72 deg. latitude). Ocean-land contrasts as a function of season are clearly reveled, as are orographic effects and seasonal and interannual variability. The space-based observations indicate that air mass thunderstorms, not large storm system dominate global activity. The ability of LIS and OTD to detect total lightning has lead to improved insight into the correlation between lightning and storm development. The relationship between updraft development and lightning activity is now well established and presents an opportunity for providing a new mechanism for remotely monitoring storm development. In this concept, lightning would serve as a surrogate for updraft velocity. It is anticipated that this capability could lead to significantly improved severe weather warning times and reduced false warning rates. This talk will summarize our space-based lightning measurements, will discuss how lightning observations can be used to monitor severe weather, and present a concept for continuous geostationary-based lightning observations.
Author
Lightning; Distributing; Cloud-to-Ground Discharges; Vertical Air Currents; Thunderstorms

20040047267 Meteorological Satellite Center, Kiyose, Japan
Monthly Report of the Meteorological Satellite Center: November 2003
November 2003; In English; In Japanese; Document files and Satellite data are recorded in either ASCII or shift JIS code; Full Disk Earth's Cloud Images are recorded in Bit-Map (BMP) format; Copyright; Avail: Other Sources

The CD-ROM concerning the November 2003 Monthly Report of the Meteorological Satellite Center (MSC) contains the observation data derived from the Geostationary Meteorological Satellite (GMS) of Japan and the Polar Orbital Meteorological Satellites operated by NOAA. The CD-ROM contains the following observation data: Full Disk Earth's Cloud Image; Cloud Image of Japan and its vicinity; Cloud Amount; Sea Surface Temperature; Cloud Motion Wind; Water Vapor Motion Wind; Equivalent Blackbody Temperature; OLR (Out-going Longwave Radiation), Solar Radiation; Snow and Ice Index; Orbit Data; Attitude Data; VISSR Image Data Catalog (Cartridge Magnetic Tape (CMT), Micro Film); TOVS (TIROS Operational Vertical Sounder) Vertical Profile of Temperature and Precipitable Water; and TOVS Total Ozone Amount.
Derived from text
Satellite Observation; Satellite Sounding; Atmospheric Sounding; Meteorological Parameters; Satellite Imagery; Japan

20040047270 Meteorological Satellite Center, Kiyose, Japan
Monthly Report of the Meteorological Satellite Center: September 2003
September 2003; In English; In Japanese; Document files and Satellite data are recorded in either ASCII or shift JIS code; Full Disk Earth's Cloud Images are recorded in Bit-Map (BMP) format; Copyright; Avail: Other Sources

The CD-ROM concerning the September 2003 Monthly Report of the Meteorological Satellite Center (MSC) contains the observation data derived from the Geostationary Meteorological Satellite (GMS) of Japan and the Polar Orbital Meteorological Satellites operated by NOAA. The CD-ROM contains the following observation data: Full Disk Earth's Cloud Image; Cloud Image of Japan and its vicinity; Cloud Amount; Sea Surface Temperature; Cloud Motion Wind; Water Vapor Motion Wind; Equivalent Blackbody Temperature; OLR (Out-going Longwave Radiation), Solar Radiation; Snow and Ice Index; Orbit Data; Attitude Data; VISSR Image Data Catalog (Cartridge Magnetic Tape (CMT), Micro Film); TOVS (TIROS Operational Vertical Sounder) Vertical Profile of Temperature and Precipitable Water; and TOVS Total Ozone Amount.
Derived from text
Satellite Observation; Satellite Sounding; Atmospheric Sounding; Meteorological Parameters; Satellite Imagery; Japan

20040047274 National Space Science and Technology Center, Huntsville, AL, USA
Total Lightning Activity as Observed from Space
Christian, Hugh J.; April 2004; 1 pp.; In English; Darwin Lightning Observatory Workshop, 7-10 Mar. 2004, Osaka, Japan; No Copyright; Avail: Other Sources; Abstract Only

Our knowledge of the global distribution of lightning has improved dramatically since the 1995 launch of the Optical

Transient Detector (OTD), followed in 1997 by the launch of the Lightning Imaging Sensor (LIS). Together, these instruments have generated a continuous seven-year record of global lightning activity. These lightning observations have provided a new global perspective on total lightning activity. For the first time, total lightning activity (CG and IC) has been observed over large regions with high detection efficiencies and accurate geographic location. This has produced new insights into lightning distributions, times of occurrence and variability. It has produced a revised global flash rate estimate (44 flashes per second) and has lead to a new realization of the significance of total ligh&g activity in severe weather. Accurate flash rate estimates are now available for areas of the earth (+/- 72 deg. latitude). Ocean-land contrasts as a function of season are clearly reveled, as are orographic effects and seasonal and interannual variability. The data set indicates that air mass thunderstorms, not large storm system dominate global activity. The ability of LIS and OTD to detect total lightning has lead to improved insight into the correlation between lightning and storm development. The relationship between updraft development and lightning activity is now well established and presents an opportunity for providing a new mechanism for remotely monitoring storm development. In this concept, lightning would serve as a surrogate for updraft velocity. It is anticipated that this capability could lead to significantly improved severe weather warning times and reduced false warning rates.
Author
Lightning; Annual Variations; Correlation; Imaging Techniques

20040050233 NASA Marshall Space Flight Center, Huntsville, AL, USA
Total Lightning Activity as Observed from Space
Christian, Hugh J.; February 10, 2004; 1 pp.; In English; Meeting with Natonal Space Projects Office on Lightning Mapper, 4-5 Mar. 2003, Taipei, Taiwan, Province of China; No Copyright; Avail: Other Sources; Abstract Only

ABSTRACT: Our knowledge of the global distribution of lightning has improved dramatically since the 1995 launch of the Optical Transient Detector (OTD), followed in 1997 by the launch of the Lightning Imaging Sensor (LIS). Together, these instruments have generated a continuous seven-year record of global lightning activity. These lightning observations have provided a new global perspective on total lightning activity. For the first time, total lightning activity (CG and IC) has been observed over large regions with high detection efficiencies and accurate geographic location. This has produced new insights into lightning distributions, times of occurrence and variability. It has produced a revised global flash rate estimate (44 flashes per second) and has lead to a new realization of the significance of total ligh&g activity in severe weather. Accurate flash rate estimates are now available for areas of the earth (+/- 72 deg. latitude). Ocean-land contrasts as a function of season are clearly reveled, as are orographic effects and seasonal and interannual variability. The data set indicates that air mass thunderstorms, not large storm system dominate global activity. The ability of LIS and OTD to detect total lightning has lead to improved insight into the correlation between lightning and storm development. The relationship between updraft development and lightning activity is now well established and presents an opportunity for providing a new mechanism for remotely monitoring storm development. In this concept, lightning would serve as a surrogate for updraft velocity. It is anticipated that this capability could lead to significantly improved severe weather warning times and reduced false warning rates.
Author
Lightning; Earth Observations (From Space); Orography; Imaging Techniques; Annual Variations

20040050637 Colorado Univ., Boulder, CO, USA
Greenland Glacier Albedo Variability
[2004]; 64 pp.; In English
Contract(s)/Grant(s): NAG5-10600; No Copyright; Avail: CASI; A04, Hardcopy

The program for Arctic Regional Climate Assessment (PARCA) is a NASA-funded project with the prime goal of addressing the mass balance of the Greenland ice sheet. Since the formal initiation of the program in 1995, there has been a significant improvement in the estimates of the mass balance of the ice sheet. Results from this program reveal that the high-elevation regions of the ice sheet are approximately in balance, but the margins are thinning. Laser surveys reveal significant thinning along 70 percent of the ice sheet periphery below 2000 m elevations, and in at least one outlet glacier, Kangerdlugssuaq in southeast Greenland, thinning has been as much as 10 m/yr. This study examines the albedo variability in four outlet glaciers to help separate out the relative contributions of surface melting versus ice dynamics to the recent mass balance changes. Analysis of AVHRR Polar Pathfinder albedo shows that at the Petermann and Jakobshavn glaciers, there has been a negative trend in albedo at the glacier terminus from 1981 to 2000, whereas the Stor+strommen and Kangerdlugssuaq glaciers show slightly positive trends in albedo. These findings are consistent with recent observations of melt extent from passive microwave data which show more melt on the western side of Greenland and slightly less on the eastern side. Significance of albedo trends will depend on where and when the albedo changes occur. Since the majority of surface melt occurs in the shallow sloping western margin of the ice sheet where the shortwave radiation dominates the energy balance in

summer (e.g. Jakobshavn region) this region will be more sensitive to changes in albedo than in regions where this is not the case. Near the Jakobshavn glacier, even larger changes in albedo have been observed, with decreases as much as 20 percent per decade.
Derived from text
Arctic Regions; Climate; Albedo; Greenland; Estimates; Glaciers; Melting; Variability; Atmospheric Radiation; Mass Distribution

20040050926 NASA Goddard Space Flight Center, Greenbelt, MD, USA
Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction
Atlas, Robert; [2003]; 4 pp.; In English; 84th AMS Annual Meeting, 11-15 Jan. 2004, Seattle, WA, USA; No Copyright; Avail: CASI; A01, Hardcopy

Scatterometer observations of the ocean surface wind speed and direction improve the depiction and prediction of storms at sea. These data are especially valuable where observations are otherwise sparse - mostly in the Southern Hemisphere and tropics, but also on occasion in the North Atlantic and North Pacific. The SeaWinds scatterometer on the QuikScat satellite was launched in June 1999 and it represents a dramatic departure in design from the other scatterometer instruments launched during the past decade (ERS-1,2 and NSCAT). More details on the SeaWinds instrument can be found in Atlas et a1 (2001) and Bloom et al. (1999). At the time of this writing, SeaWinds scatterometer data from the ADEOS 2 satellite are not yet available . Therefore this paper will be limited to results from the SeaWinds scatterometer on Quikscat. This presentation shows the influence of QuikScat data in data assimilation systems both from the NASA Data Assimilation Office (GEOS-3) and from NCEP (GDAS).
NASA
Numerical Weather Forecasting; Scatterometers; Assimilation; Geos 3 Satellite; Earth Observations (From Space)

48
OCEANOGRAPHY

Includes the physical, chemical and biological aspects of oceans and seas; ocean dynamics; and marine resources. For related information see also *43 Earth Resources and Remote Sensing*.

20040047277 NASA Goddard Space Flight Center, Greenbelt, MD, USA
Fresh Water Content Variability in the Arctic Ocean
Hakkinen, Sirpa; Proshutinsky, Andrey; [2003]; 52 pp.; In English; Original contains black and white illustrations; No Copyright; Avail: CASI; A04, Hardcopy

Arctic Ocean model simulations have revealed that the Arctic Ocean has a basin wide oscillation with cyclonic and anticyclonic circulation anomalies (Arctic Ocean Oscillation; AOO) which has a prominent decadal variability. This study explores how the simulated AOO affects the Arctic Ocean stratification and its relationship to the sea ice cover variations. The simulation uses the Princeton Ocean Model coupled to sea ice. The surface forcing is based on NCEP-NCAR Reanalysis and its climatology, of which the latter is used to force the model spin-up phase. Our focus is to investigate the competition between ocean dynamics and ice formation/melt on the Arctic basin-wide fresh water balance. We find that changes in the Atlantic water inflow can explain almost all of the simulated fresh water anomalies in the main Arctic basin. The Atlantic water inflow anomalies are an essential part of AOO, which is the wind driven barotropic response to the Arctic Oscillation (AO). The baroclinic response to AO, such as Ekman pumping in the Beaufort Gyre, and ice meldfreeze anomalies in response to AO are less significant considering the whole Arctic fresh water balance.
Author
Arctic Ocean; Fresh Water; Oscillations; Sea Ice; Ocean Models

51
LIFE SCIENCES (GENERAL)

Includes general research topics related to plant and animal biology (non-human); ecology; microbiology; and also the origin, development, structure, and maintenance of animals and plants in space and related environmental conditions. For specific topics in life sciences see *categories 52 through 55*.

20040045304 Ohio Aerospace Inst., Cleveland, OH, USA
Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow
Radhakrishnan, Krishnan; Cabrera, Marco; Annals of Biomedical Engineering; [2000], pp. S-104; In English; Biomedical Engineering Society 2000 Annual Fall Meeting, 12-14 Oct. 2000, Seattle, WA, USA
Contract(s)/Grant(s): NCC3-782
Report No.(s): T9.21; Copyright; Avail: Other Sources; Abstract Only

An acute reduction in oxygen delivery to skeletal muscle is generally associated with profound derangements in substrate metabolism. Given the complexity of the human bioenergetic system and its components, it is difficult to quantify the interaction of cellular metabolic processes to maintain ATP homeostasis during stress (e.g., hypoxia, ischemia, and exercise). Of special interest is the determination of mechanisms relating tissue oxygenation to observed metabolic responses at the tissue, organ, and whole body levels and the quantification of how changes in oxygen availability affect the pathways of ATP synthesis and their regulation. In this study, we apply a previously developed mathematical model of human bioenergetics to study effects of ischemia during periods of increased ATP turnover (e.g., exercise). By using systematic sensitivity analysis the oxidative phosphorylation rate was found to be the most important rate parameter affecting lactate production during ischemia under resting conditions. Here we examine whether mild exercise under ischemic conditions alters the relative importance of pathways and parameters previously obtained.
Author
Sensitivity Analysis; Metabolism; Musculoskeletal System; Blood Flow

20040046860 Zhejiang Univ., China
A Study on Visual Search and Selection of Pull-down Menu
Shen, Mo-wei; Tao, Rong; Liu, Ying; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 72-74; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this study is to explore the characteristics of user's visual search and selection through interaction with pull-down menus. The visual search time and selection time of interaction were recorded by eye tracking system, when 14 participants were performing the task of pull-down menu selection, with different menu length, type of menu item and position of target item. It was found that selection time was influenced jointly by menu length, type of menu item and target location, while visual search time was only influenced by target location. The results of this experiment support the hypothesis that the pull-down menu was characteristic of serial, self-terminated and top-down.
Author
Vision; Human Factors Engineering; Graphical User Interface

20040046873 Institute of Space Medico-Engineering, Beijing, China
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats
Zhao, Lun; Zhao, De-ming; Wei, Jin-he; Wang, Yu-qing; Huang, Zeng-ming; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 75-76; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to examine the effect of extremely low frequency magnetic field (ELMF) on the brain trauma in rats. Using the focal left-brain cortex contusion model, rats were divided into two groups, ELMF group (3 d and 8 d) and control group (3 d and 8 d), ELMF stimulations were given after the brain trauma, provided by a coil (phi 10 cm) which was driven by 15 Hz sinusoidal signals so that ELMF strength of 18 mT at the midpoint was obtained. The morphologic changes were observed in these groups. As compared with the control group, the extent of the inflammatory reaction and the neuronal damage was apparently lighter in magnetic field group, especially in 8 d group. At the far away region from the injured brain area, the neuronal shape was changed, and the amount of this special neurocyte was larger in magnetic field group than that in control group, especially in 8 d group. ELMF stimulation in the present study may alleviate the brain injury reaction. Attention should be paid to the role of the special neurocyte during the brain injury.
Author
Extremely Low Frequencies; Magnetic Fields; Neurophysiology; Brain Damage

20040046874 Sichuan Univ., Chengdu, China

Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats

Chen, Li-guo; Qu, Yi; Peng, Wen-zhen; Wang, Yue-qi; Xiao, Jing; Wang, Zheng-rong; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 77-78; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to investigate a gene therapy delivery system based on microcapsules enclosing recombinant Chinese hamster ovary (CHO) cells engineered to secrete a therapeutic peptide-atrial natriuretic peptide (ANP). Human atrial natriuretic peptide gene transfecting Chinese hamster ovary (CHO) cells were encapsulated in non-antigenic biocompatible polycaprolactone (PCL) capsules prior to their implantation into rats, then, the PCL-tubes were implanted into hypertensive DSS rats intraperitoneally. The PCL-tubes 2 d post implantation caused a significant delay of blood pressure increase. The effect lasted for more than 5 months. The PCL-tubes also caused significant increases in renal blood flow, glomerular filtration rate, sodium output, urine excretion. Plasma levels of ANP in rats implanted with the PCL-tubes containing engineering cells is higher than that of the control rats. This study demonstrates encapsulated engineering cells have significant potential in treatment of hypertension.

Author

Deoxyribonucleic Acid; Hypertension; Ovaries; Gene Therapy

20040046945 NASA Glenn Research Center, Cleveland, OH, USA

A Quantitative Study of Oxygen as a Metabolic Regulator

Radhakrishnan, Krishnan; LaManna, Joseph C.; Cabera, Marco E.; Applied Cardiopulmonary Pathophysiology; 2000; Volume 9, No. 4, pp. 363-367; In English

Contract(s)/Grant(s): NCC3-782; NCC3-622; NHLBI-HL-58653-01A1; Copyright; Avail: Other Sources

An acute reduction in oxygen delivery to a tissue is associated with metabolic changes aimed at maintaining ATP homeostasis. However, given the complexity of the human bio-energetic system, it is difficult to determine quantitatively how cellular metabolic processes interact to maintain ATP homeostasis during stress (e.g., hypoxia, ischemia, and exercise). In particular, we are interested in determining mechanisms relating cellular oxygen concentration to observed metabolic responses at the cellular, tissue, organ, and whole body levels and in quantifying how changes in tissue oxygen availability affect the pathways of ATP synthesis and the metabolites that control these pathways. In this study; we extend a previously developed mathematical model of human bioenergetics, to provide a physicochemical framework that permits quantitative understanding of oxygen as a metabolic regulator. Specifically, the enhancement - sensitivity analysis - permits studying the effects of variations in tissue oxygenation and parameters controlling cellular respiration on glycolysis, lactate production, and pyruvate oxidation. The analysis can distinguish between parameters that must be determined accurately and those that require less precision, based on their effects on model predictions. This capability may prove to be important in optimizing experimental design, thus reducing use of animals.

Author

Metabolism; Energy Transfer; Metabolites; Oxygenation; Sensitivity Analysis; Regulators; Homeostasis

20040046946 Defence Science and Technology Organisation, Fishermans Bend, Australia

Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei

Shahin, Susan; Dorsch, Matthias; August 2003; 25 pp.; In English

Report No.(s): DSTO-TR-1509; DODA-AR-012-919; Copyright; Avail: Other Sources

Melioidosis is a potentially lethal infection endemic in Northern Australia and Southeast Asia. The causative bacterium, Burkholderia pseudomallei, is resistant to many of the commonly used antibacterial agents. Therefore, successful treatment of the disease is dependent on rapid and accurate diagnosis. The current diagnostic techniques are time consuming and lacking in specificity. We have developed a PCR procedure using the R.A.P.I.D(TM) and real time monitoring of product formation. The reaction is significantly faster than conventional PCR and allows the simultaneous evaluation of specificity using melting curve analysis.

Author

Polymers; Chain Reactions (Chemistry); Antiinfectives and Antibacterials; Detection

20040047245 NASA Marshall Space Flight Center, Huntsville, AL, USA

Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5

Swingle, M. R.; Honkanen, R.; Ciszak, E. M.; January 2004; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

Serinehhreonine protein phosphatase-5 (PP5) affects many signaling networks that regulate cell growth and cellular responses to stress. Here we report the crystal structure of the PP5 catalytic domain (PP5c) at a resolution of 1.6 A. From this structure we resolved the mechanism for PP5-mediated hydrolysis of phosphoprotein substrates, which requires the precise positioning of two metal ions within a con served Aspn-271-M(sub 1):M(sub 2)-W(sup 1)-His-427-His-304-Asp-274 catalytic motif. The structure of PPSc provides a structural basis for explaining the exceptional catalytic proficiency of protein phosphatases, which are among the most powerful known catalysts. Resolution of the entire C-terminus revealed a novel subdomain, and the structure of the PP5c should also aid development of type-specific inhibitors.
Author
Amino Acids; Catalytic Activity; Cell Division; Crystal Structure

20040047246 Alabama Univ., Huntsville, AL, USA
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens
Bernhardsdotter, Eva C. M. J.; Pusey, Mark L.; Ng, Joseph D.; Garriott, Owen K.; January 2004; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

The gene encoding an extracellular alpha-amylase, TTA, from the hyperthermophilic archaeon Thermococcus thioreducens was cloned and expressed in Escherichia coli. Primary structural analysis revealed high similarity with other a-amylases from the Thermococcus and Pyrococcus genera, as well as the four highly conserved regions typical for a-amylases. The 1374 bp gene encodes a protein of 457 amino acids, of which 435 constitute the mature protein preceded by a 22 amino acid signal peptide. The molecular weight of the purified recombinant enzyme was estimated to be 43 kDa by denaturing gel electrophoresis. Maximal enzymatic activity of recombinant TTA was observed at 90 C and pH 5.5 in the absence of exogenous Ca(2+), and the enzyme was considerably stable even after incubation at 90 C for 2 hours. The thermostability at 90 and 102 C was enhanced in the presence of 5 mM Ca(2+). The extraordinarily high specific activity (about 7.4 x 10(exp 3) U/mg protein at 90 C, pH 5.5 with soluble starch as substrate) together with its low pH optimum makes this enzyme an interesting candidate for starch processing applications.
Author
Cloning (Biology); Genes; Thermophiles; Molecular Biology; Microorganisms

20040047255 Lawrence Livermore National Lab., Livermore, CA, USA
Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks
Sokhansanj, B. A.; Garnham, J. B.; Fitch, J. P.; Jan. 23, 2002; 18 pp.; In English
Report No.(s): DE2004-15005673; UCRL-JC-144382; No Copyright; Avail: Department of Energy Information Bridge

Microarrays and DNA chips are an efficient, high-throughput technology for measuring temporal changes in the expression of message RNA (mRNA) from thousands of genes (often the entire genome of an organism) in a single experiment. A crucial drawback of microarray experiments is that results are inherently qualitative: data are generally neither quantatively repeatable, nor may microarray spot intensities be calibrated to in vivo mRNA concentrations. Nevertheless, microarrays represent by the far the cheapest and fastest way to obtain information about a cell's global genetic regulatory networks. Besides poor signal characteristics, the massive number of data produced by microarray experiments poses challenges for visualization, interpretation and model building. Towards initial model development, we have developed a Java tool for visualizing the spatial organization of gene expression in bacteria. We are also developing an approach to inferring and testing qualitative fuzzy logic models of gene regulation using microarray data. Because we are developing and testing qualitative hypotheses that do not require quantitative precision, our statistical evaluation of experimental data is limited to checking for validity and consistency. Our goals are to maximize the impact of inexpensive microarray technology, bearing in mind that biological models and hypotheses are typically qualitative.
NTIS
Arrays; Models; Genetics; Microbiology; Deoxyribonucleic Acid; Molecular Electronics

20040050234 NASA Marshall Space Flight Center, Huntsville, AL, USA
Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711
Bernhardsdotter, Eva C. M. J.; Pusey, Marc L.; Ng, Joseph D.; Garriott, Owen K.; [2004]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

An alkaliphilic amylase producing bacterium, Bacillus sp. strain L 711, was selected among 13 soda lakes isolates. When

grown at pH 10.5 and 37 C, strain L711 produced multiple forms of amylases in the culture broth. One of these, BAA, was purified from the culture supernatant by QAE column chromatography and preparative native gel electrophoresis. The molecular weight of BAA was determined to be 51 kDa by denaturing gel electrophoresis. The pH optima for activity below and above 40 C were 9.5 - 10.0 and 7.0 - 7.5 respectively. BAA was stable in the pH range 6-11 and was completely inactivated at 55 C. The thermostability was not increased in the presence of Ca(2+). The enzyme was strongly inhibited by Ca(2+), Zn(2+), Mg(2+), Mn(2+), Ba(2+) and Cu(2+), whereas the presence of Na(+), Co(2+) and EDTA (10 mM) enhanced enzymatic activity. The K(sub m), and specific activity of BAA on soluble starch were 1.9 mg/ml and 18.5 U/mg respectively. The main end products of hydrolysis were maltotetraose, maltose and glucose.
Author
Enzyme Activity; Alkalies; Bacillus; Molecular Weight; Thermal Stability

20040050345 BAE Systems Analytical Solutions, Inc., Huntsville, AL, USA
DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology?
vanderWoerd, Mark; [2004]; 1 pp.; In English
Contract(s)/Grant(s): NAS8-02096; No Copyright; Avail: Other Sources; Abstract Only

The structure and function of a biologically active molecule are related. To understand its function, it is necessary (but not always sufficient) to know the structure of the molecule. There are many ways of relating the molecular function with the structure. Mutation analysis can identify pertinent amino acids of an enzyme, or alternatively structure comparison of the of two similar molecules with different function may lead to understanding which parts are responsible for a functional aspect, or a series of 'structural cartoons' - enzyme structure, enzyme plus substrate, enzyme with transition state analog, and enzyme with product - may give insight in the function of a molecule. As an example we will discuss the structure and function of the restriction enzyme BsoBI from Bacillus stearothemzophilus in complex with its cognate DNA. The enzyme forms a unique complex with DNA in that it completely encircles the DNA. The structure reveals the enzyme-DNA contacts, how the DNA is distorted compared with the canonical forms, and elegantly shows how two distinct DNA sequences can be recognized with the same efficiency. Based on the structure we may also propose a hypothesis how the enzymatic mechanism works. The knowledge gained thru studies such as this one can be used to alter the function by changing the molecular structure. Usually this is done by design of inhibitors specifically active against and fitting into an active site of the enzyme of choice. In the case of BsoBI one of the objectives of the study was to alter the enzyme specificity. In bone biology there are many candidates available for molecular study in order to explain, alter, or (temporarily) suspend activity. For example, the understanding of a pathway that negatively regulates bone formation may be a good target for drug design to stimulate bone formation and have good potential as the basis for new countermeasures against bone loss. In principle the same approach may aid muscle atrophy, radiation damage, immune response changes and other risks identified for long-duration Space travel.
Author
Activity (Biology); Amino Acids; Bacillus; Bone Demineralization; Muscles; Deoxyribonucleic Acid

20040050640 Brigham and Women's Hospital, Boston, MA
Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer
Mok, Samuel C.; Sep. 2003; 64 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9563
Report No.(s): AD-A420870; No Copyright; Avail: CASI; A04, Hardcopy

The general theme of this program deals with primary prevention and early diagnosis of ovarian cancer. The authors have identified several genetic changes in microscopic and early stage ovarian tumors in Project 1, suggesting that these changes may represent early events during ovarian tumor development and progression. They have shown that Protease M over-expressed in a majority of stage I tumors and can be secreted by ovarian cancer cells in Project 2, suggesting that it is a potential marker for early detection of the disease. Furthermore, the authors have demonstrated that estradiol significantly simulated normal ovarian epithelial cell proliferation in Project 3, suggesting that there may be relationships between therapeutic hormone usage and ovarian cancer risk. Finally, they have identified new classes of lysophospholipids elevated in serum and ascites in Project 4, suggesting that these lipids can not only be used as diagnostic but also as potential prognostic markers for disease progression and novel therapeutic targets. Several new techniques have been established and applied. Collaboration among investigators has been initiated and several manuscripts and abstracts have been generated. Also, experiments have been finished according to the Statement of Work originally proposed.
DTIC
Cancer; Detection; Diagnosis; Genetics; Health; Markers; Prevention

20040050642 Cleveland Clinic Foundation, Cleveland, OH
Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics
Thomas, James D.; Sep. 2003; 13 pp.; In English
Contract(s)/Grant(s): DAMD17-02-2-0040
Report No.(s): AD-A420883; No Copyright; Avail: CASI; A03, Hardcopy

To improve battlefield assessment of injured personnel we are exploiting several convergent trends in medicine and technology, including ultrasound miniaturization and wireless connectivity. Specific aims include (1) validation of portable ultrasound to diagnose cardiac tamponade, pneumothorax, intraabdominal hemorrhage, etc.; (2) extension of digital echocardiography and local telemedicine to assist remote centers in transesophageal echocardiography; (3) Development of wireless telemedicine systems to relay ultrasonic images and loops to a remote review station; (4) Development of a precision guide for percutaneous drainage procedures using ultrasound guidance; (5) Combining this guide with wireless telemetry for remotely guided drainage; and (6) Extending this work to real-time three-dimensional ultrasonography. The technical and clinical challenges of such a proposal are complex but we have made significant progress on all aims, with wireless telemetry of continuous ultrasound data already a reality. If these goals can be accomplished, the ability of the Department of Defense to reduce mortality from battlefield trauma will be greatly enhanced. While this project has been developed specifically for battlefield telemedicine, the tools and techniques developed herein will have enormous application in the civilian sector, including delivery of diagnostic services to remote towns with little or no hardwire access to the internet.
DTIC
Diagnosis; Emergencies; Medical Services; Telemedicine

20040050643 Scripps Research Inst., La Jolla, CA
Vitronectin and Integrin alpha(v)Beta3 in Ovarian Carcinoma
Huang, Shuang; Jul. 2003; 13 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-00-1-0566
Report No.(s): AD-A420884; No Copyright; Avail: CASI; A03, Hardcopy

Ovarian cancer is the leading gynecological cancer that results in death. Due to the lack of symptom in the early stage of disease, most ovarian cancers are diagnosed in the late stage. Current therapy such as chemotherapy is not very effective for curing ovarian cancer. This proposal aims to develop an adenovirus-based gene therapy for suppression ovarian malignancies. In our studies, we have found that the interaction between vitronectin and alphavBETA3 integrin is essential for ovarian cancer cell survival and invasion. We thus developed potent small interfering RNA targeting vitronectin and BETA3 integrin subunit. We inserted these specific siRNAs to adenovirus vector and test whether Ad- delivered siRNA could inhibit ovarian malignancies. We demonstrate that Ad-delivered siRNA can significantly reduce ovarian cancer cell survival and invasiveness as determined by in vitro assays. Using SCID mouse model, we further show that Ad-delivered siRNA also inhibit in vivo tumor development and prolong animal survival. Our study provide the basis to develop an alternative therapeutic modality for ovarian cancer.
DTIC
Cancer; Cells (Biology)

20040050644 Duke Univ., Durham, NC
Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility
Irazoqui, Javier E.; Aug. 2003; 55 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0231
Report No.(s): AD-A420886; No Copyright; Avail: CASI; A04, Hardcopy

Cdc42p and other proteins polarize to a cap at the presumptive bud site and the tip of the bud. The observation that Cdc42p polarizes in the complete absence of F-actin has been confirmed repeatedly. These studies used LatA as a method to completely depolymerize actin, and suggested that Cdc42p polarization is actin-independent. Polarized secretion and endocytic uptake require F-actin cables and patches, respectively. When LatA is applied to yeast cells neither actin patches nor cables are detectable, disrupting all F- actin-dependent processes. Thus, Cdc42p polarization occurs by a non-secretory pathway. Is the polarized cap static? Current models of Cdc42p function propose that the cap is an organizing center for polarity. Since it is associated with the plasma membrane, the cap may be static, acting as a polymerization site for actin cables by formins, assembly of septins, signal transduction, etc. Our data indicate that the cap is, in reality, dynamic. We show that the loss of actin cables, but not actin patches, leads to Cdc42p delocalization. We propose that the initial polarization of Cdc42p is an actin- independent process; continued polarization is the result of two competing processes: endocytic removal

of the plasma membrane, and a deposition process, dependent on polarized secretion.
DTIC
Cancer; Locomotion; Mammary Glands; Polarity

20040050645 Evanston Northwestern Healthcare Research Inst., Evanston, IL
Characterization of the Chicken Ovarian Cancer Model
Rodriguez, Gustavo C.; Aug. 2003; 14 pp.; In English
Contract(s)/Grant(s): DAMD17-00-1-0570
Report No.(s): AD-A420887; No Copyright; Avail: CASI; A03, Hardcopy

We believe that the domestic laying hen has great potential as an animal model for ovarian cancer prevention research. Unlike other ovarian cancer models, which require experimental induction of ovarian tumors, chickens develop ovarian adenocarcinoma spontaneously, with an incidence ranging from 13 to 40 percent between four and six years of life. Few investigators have taken advantage of the chicken to study ovarian cancer. Thus, the chicken ovarian cancer model remains to be validated and developed. As part of a prevention trial in chickens funded by the Department of Defense, we have accumulated 1400 chicken reproductive tracts including 140 with adenocarcinomas, and gathered valuable data regarding the natural history of these tumors. This provides the remarkable opportunity to critically evaluate the chicken ovarian cancer animal model and determine its relevance to human ovarian cancer research. The aim of the current proposal is to increase our understanding of the molecular and histological features of chicken ovarian cancers. In addition, we will develop a histological classification for chicken ovarian cancers, which is a critically important prerequisite to the widespread use of this animal model for ovarian cancer research.
DTIC
Cancer; Chickens

20040050648 Miami Univ., FL
Eletrophysiological Changes in NF1
Fieber, Lynne A.; Sep. 2003; 26 pp.; In English
Contract(s)/Grant(s): DAMD17-99-1-9578
Report No.(s): AD-A420897; No Copyright; Avail: CASI; A03, Hardcopy

The K current types of human cultures Schwann cells (SC) formed a continuum from normal SC to malignant tumor SC, with A type K current found in quiescent normal SC never exposed to exogenous growth factors such as glial growth factor (GGF, human recombinant heregulin) and in SC from the dermal neurofibroma, and with non-inactivating K current found in the more malignant tumor cultures. Blocking the non- inactivating K current blocked proliferation. A manuscript based on the findings form the second year of the grant was published (Fieber et al 2003). We discovered a component of tumor K current called Ca2+ - activated K current. We believe this is the current component that induces proliferation in NFl Schwann cells (SC). Thus our experimental objectives during the third and fourth years of the project were to identify Ca2+ - activated K Current 5 is SC from our different NFl cultures and to test the effects on cell proliferation of blocking these currents. A specific blocker of this subtype of Ca2+ - activated K current blocked 21-35% of the current of NFl-derived SC. One proliferating normal SC culture showed no inhibition of proliferation by the drug. We believe that the Ca2+ - activated K current of NFl SC is a worthwhile focus of future experiments on the electrophysiological characteristics of NFl SC.
DTIC
Electrophysiology

20040050649 Academy of Health Sciences (Army), Fort Sam Houston, TX
Alaska and the Alaska Federal Health Care Partnership
Hoyt, Richard W.; Aug. 2002; 120 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420898; HCA-35-02; No Copyright; Avail: CASI; A06, Hardcopy

The intent of the Alaska Federal Healthcare Partnership is to expand clinical and support capabilities of the Alaska Native Medical Center (ANMC), Third Medical Group(3MDG), Bassett Army Community Hospital (BACH), 354th Medical Group (354th MDG), USA Coast Guard (USCG) and Veteran s Administration (VA) through sharing of resources. The Alaska Federal Healthcare Partnership seeks to deliver cost effective health care to Indian Health Service (IHS), VA, USCG and Department of Defense(DoD) beneficiaries. The Partnership has demonstrated savings of over one million dollars annually. This is a significant accomplishment when the cost of health care in Alaska routinely exceeds 200 percent of CONUS costs and very

few providers accept Medicare or TRICARE. This project examines the qualitative aspects of health care delivery by the AFHCP to eligible beneficiaries within Alaska.
DTIC
Health; Management Planning

20040050650 Florida Univ., Gainesville, FL
NF1 Tumor Specific Therapeutic Modeling
Muir, David F.; Aug. 2003; 28 pp.; In English
Contract(s)/Grant(s): DAMD17-00-1-0549
Report No.(s): AD-A420899; No Copyright; Avail: CASI; A03, Hardcopy

The goal of this project is to establish an animal model of plexiform neurofibroma which then can be used to test emerging anticancer therapies for the management of tumor growth in NFl patients. The first specific aim is to establish a syngraft model of NFl tumorigenesis. Progress toward this aim includes: a) established and characterized numerous Schwann cell cultures from wild-type and heterozygous and homozygous and homozygous null NFl knockout mouse embryos; b)documented several lines of evidence that Nfl-/- Schwann cell have a growth advantage in vitro; c)effectively transfected Nf1-/- Schwann cell cultures with AAV-GFP; d)implanted GFP-labeled Nf1-/- cells in mouse nerve and detected them with GFP immunohisto-chemistry; e) documented tumorigenic growth by Nf1-/- Schwann cells implanted in the nerves of adult mice and; f) established a highly relevant syngraft model by implanting Nf1-/- Schwann cell into mice with and Nfl background. The second aim is to establish a xenograft model to examine the growth of human neurofibroma tumor cells. Progress toward this aim includes: a)established a breeding colony of Nf1-/- scid mice to be used as hosts for tumor grafts; b)achieved sizeable tumors by engrafting human NFl Schwann cells in mouse nerves; c)provide a thorough characterization of human NFl schwann cells cultures and their tumorigenic properties; d) achieve NMR methods to access tumor growth within the mouse nerve and; e)assess tumorigenic growth and neovascularization by engrafted NFl tumor cells.
DTIC
Neoplasms; Therapy; Tumors

20040050651 Academy of Health Sciences (Army), Fort Sam Houston, TX
Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes?
Johnson, David A.; Apr. 2002; 34 pp.; In English
Report No.(s): AD-A420900; HCA-28-02; No Copyright; Avail: CASI; A03, Hardcopy

As the use of managed care companies expands and Medicare reimbursements are reduced, organizations seek various ways to reduce costs on inpatient wards. Many health care organizations have chosen to increase the use of unlicensed assistive personnel in lieu of registered nurses on inpatient wards. This has lead professional nursing organizations to express concerns that patient safety was being compromised and patient care quality was diminishing in an effort to cut cost. Upon review of a 13-month period of admissions at Landstuhl Regional Medical Center, it is concluded that staffing levels had very little effect on patient outcomes that are considered nursing staff level sensitive. Though more detailed research is needed, it is believe that, in these cases, the patients would have developed the ensuing negative outcomes regardless of the level of nursing staff afforded them.
DTIC
Health; Management Planning; Patients; Predictions

20040050652 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas
Morris, Mark K.; Aug. 2002; 51 pp.; In English
Report No.(s): AD-A420901; HCA-15-02; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this study is to apply a psychometric tool for readiness assessment, the Readiness Estimate and Deployability Index (READI), to Army Nurse Corps (ANC) officers assigned to U.S. Army MEDDAC, Fort Hood, Texas. Because of increases in the number and duration of deployment missions, Army leadership needs to ensure that ANC officers are prepared to perform skills and functions critical to patient care in a field environment. The READI is a survey questionnaire of self-reported competencies and behaviors based on six dimensions of readiness: clinical nursing competency, operational competency, survival skills, personal and psychological readiness, leadership and administrative support, and group integration and identification. Convenience samples of 97 active duty MEDCOM non-Professional Filler System (PROFIS)

nurses and 50 active duty PROFIS/ Forces Command (FORSCOM) nurses assigned to Darnall Army Community Hospital participated by completing the instrument. Results for this application were tested for internal consistency of item responses and assessed by Cronbachs coefficient alpha. The findings offer evidence for the expanded application of the READI model to differing ANC populations to provide meaningful and consistent assessments of readiness. Comparative results were summarized by a series of newly developed graphic panoramic displays (GPDs). Findings from this study provide definitive evidence for the utility of GPD comparisons of cohort groups to identify readiness differences between the groups and provide detailed indicators in formulating readiness forecasts and training needs in preparation for future deployments.
DTIC
Fillers; Health; Hospitals; Management Planning; Medical Personnel

20040050653 Academy of Health Sciences (Army), Fort Sam Houston, TX
The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities
Ponce, Joseph A.; May 21, 2002; 59 pp.; In English
Report No.(s): AD-A420902; HCA-3-02; No Copyright; Avail: CASI; A04, Hardcopy

This study examines the issue of privacy and security in the Military Treatment Facility(MTF) in light of the Health Insurance Portability and Accountability Act (HIPAA). It analyzes the actions of players within the healthcare industry with regard to preparation for these regulations and seeks to draw a parallel for success in the Department of Defense (DoD), specifically, the Armed Services environment. The role of the privacy officer is examined in detail including job specifications and potential placement within the organization. The study conducts a survey of MTFs with regard to preparation on a questionnaire basis. This is correlated with whether or not the organization has a dedicated a privacy officer or privacy team. The study shows a strong correlation exists between those MTFs that have recognized the need for and dedicated a privacy officer or team and perceived success in preparation. Civilian institutions are examined thoroughly for their mechanisms in planning and training in the areas of privacy and security. The study attempts to raise the awareness of the criticality of HIPAA regulations and the need for adequate and prepared personnel to deal with the approaching changes. Finally, a road map is offered for commanders and DCAs to achieve compliance with HIPAA regulations within the required time frame.
DTIC
Health; Law (Jurisprudence); Maintenance; Management Planning; Privacy

20040050654 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Study of Prescription Non-Compliance Womack Army Medical Center
Schiller, Lee H., Jr; Apr. 2002; 51 pp.; In English
Report No.(s): AD-A420903; HCA-2-02; No Copyright; Avail: CASI; A04, Hardcopy

The cost of pharmaceuticals in the U.S. healthcare system is increasing at a rate that is twice as high as the aggregate total of medical inflation. Conversely, prescribing drug therapy continues to be the most effective utilization of healthcare resources in the pursuit of maintaining superior quality of care and achieving healthy outcomes. Nationally, non-compliance with claiming prescriptions accounts for 9 to 13 percent of all prescribed medications. The consequences of non-compliance are measured in terms of additional economic costs and negative health outcomes. In fiscal year 2001, 7.1 percent (36,319) of all provider order entry outpatient prescriptions went unclaimed at the main pharmacy of Womack Army Medical Center. The population was separated into two subgroups of non-compliance. The first group (n=7,230) included prescriptions pre-filled by the pharmacy upon provider order. The second group(n=29,089) comprised of prescriptions ordered but never initiated by the patient. A sample population from the non-compliant and compliant groups (n=10,878) was analyzed utilizing binary logistic regression to determine a demographic profile of non-compliant patients. Each of the demographic variables provided strong statistical significance $p<.01$ and the combination of the variables yielded an $r2 = 3.5$. The average indirect and direct cost to the pharmacy for a non-compliant prescription was $5.36 resulting in a total cost of $38,752. The largest class of non-compliant medications was iron followed by vitamins, antiinflamatories, antihistamines, and analgesics. This research provides findings support for organizational decision- making and process improvement initiatives.
DTIC
Health; Management Planning

20040050655 University of South Florida, Tampa, FL

Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer

Nicosia, Santo V.; Cheng, Jin Q.; Aug. 2003; 68 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0670

Report No.(s): AD-A420904; No Copyright; Avail: CASI; A04, Hardcopy

During past year, we have demonstrated that AKT2 contributes to chemoresistance. The mechanism by which AKT induces cisplatin resistance is that AKT2 phosphorylates apoptosis signal-regulating kinase 1 (ASKl) and inhibits its kinase activity leading to inactivation of cisplatin- stimulated JNK and p38 kinase as well as Bax conformational change. Moreover, geranylgeranyltransferase I and farnesyltransferase inhibitors (GGTI and FTT) sensitize ovarian cancer cells to cisplatin-induced apoptosis.

DTIC

Cancer; Cell Division; Oncogenes; Proteins; Survival

20040050657 Academy of Health Sciences (Army), Fort Sam Houston, TX

A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital

Unruh, Charles L.; Jun. 2002; 49 pp.; In English; Original contains color illustrations

Report No.(s): AD-A420906; HCA-16-02; No Copyright; Avail: CASI; A03, Hardcopy

The goal of this project is to develop and evaluate four courses of action (COA) in order to determine the most efficient and effective method to care for Moncrief Army Community Hospitals Special Care Unit (SCU) inpatients. A common hypothesis shared by the author and many others at Moncrief was that the SCU was inefficient and much costlier than closing it and receiving the SCU care from the TRICARE network hospitals. This project, by analyzing the following options: COA 1- Close the SCU and Transport Future Inpatients to the UCC and Local Hospitals, COA 2- Close the SCU and Integrate Future Inpatients into the Medical Surgical Ward, COA 3- Close the SCU and Transport Future Inpatients to the Dorn VA Medical Center, and COA 4- Maintain the SCU in its Current Configuration, will help determine how Moncrief s SCU patients are seen in the future. A thorough analysis of the data strongly suggests that the hypothesis of this study should be rejected. Maintaining the SCU in its current configuration costs $338,964, versus closing it and receiving the care from TRICARE network hospitals at a cost of $479,471. This $140,507 difference equates to a very significant government cost savings.

DTIC

Commerce; Health; Hospitals; Management Planning

20040050658 Johns Hopkins Univ., Baltimore, MD

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer

Kurman, Robert J.; Wu, T. C.; Aug. 2003; 17 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0667

Report No.(s): AD-A420909; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study is to test whether the greater extent of intracellular spreading of encoded antigen will generate a higher degree of antigen-specific immunity and ant-tumor effects in vaccinated mice. We previously showed that DNA vaccine of HVP22 linkage with to a model antigen, E7 generates strong CD8 specific T cell response and anti-tumor effects. We generated a DNA vaccines encoding BVP22 and MDV-I VP22 linked with E7, respectively in this report. We demonstrated that compared with mice vaccinated with DNA encoding wild-type E7, mice vaccinated with BVP22/E7 and MDV-1 VP22/E7 DNA exhibited a significant increase in number of E7- specific CD8+-T-cell precursors as well as stronger anti-tumor effects. Furthermore, our data indicated that the anti-tumor effect was CD8 dependent. These results suggested that the development of vaccines encoding VP22 fused to a target antigen might be a promising strategy for improving DNA vaccine potency.

DTIC

Antigens; Cancer; Diagnosis; Pathogenesis; Project Management; Vaccines

20040050659 Johns Hopkins Univ., Baltimore, MD

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment

Kurman, Robert J.; Aug. 2003; 8 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0667

Report No.(s): AD-A420911; No Copyright; Avail: CASI; A02, Hardcopy

The etiology/pathogenesis of serous carcinoma, the most common type of ovarian cancer, is poorly understood. Until this is clarified the development of new diagnostic tests and therapy will remain empiric. The overall objective of our program is to identify biomarkers that define the molecular pathogenesis of serous carcinoma, and thereby develop an early detection test and antigen-specific immunotherapy for this deadly disease. During the first year of funding, significant progress has been made and the majority of specified tasks have been accomplished. This has led to five publications in high impact journals and the generation of important new research resources, including tissue and blood specimens, tissue microarrays, ovarian cancer cell lines, antibodies to novel ovarian cancer markers, and novel naked DNA vaccine constructs. In order to gain access to a wider variety of specimens including those that are not available in our tissue bank we have established a close collaboration with Dr Susanne Kruger Kjaer who is the principal investigator on the Danish population-based Malignant Ovary (MALOVA) study. This will improve the power of our studies. Continued support of this program will accelerate advances in diagnosis and treatment, leading an improved outcome for ovarian cancer patients.
DTIC
Cancer; Diagnosis; Pathogenesis

20040050660 Academy of Health Sciences (Army), Fort Sam Houston, TX
Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders
O'Haver, Timothy G.; May 13, 2002; 43 pp.; In English
Report No.(s): AD-A420913; HCA-31-02; No Copyright; Avail: CASI; A03, Hardcopy

Appointments that are not kept can potentially impact both the personal health status of the patient and the financial health of the Military Health care System. This report studied nine predictors of appointment non-adherence using both univariate and multivariate analyses to show which predictors have the greatest effect on patient appointment keeping behavior and the resultant benefit of automated telephone reminder technology. Univariate analysis revealed the following eight significant relationships with appointment keeping behavior: age, marital status, beneficiary category, Tricare Prime enrollment, proximity to the facility, branch of service, appointment day of the week and call to appointment interval. However, multivariate analysis revealed that age, beneficiary category, sponsors branch of service and marital status were the only variables that contributed to the statistical power of the predictive model, which produced an R2 value of 0.011 ($p < .001$). The study went on to find that implementation of an automated appointment reminder system yielded a statistically significant reduction in the overall clinic no-show rate. The reduction from 8.65% in FY00 to 7.60% in FY01 resulted in a $X2 (1) = 7.24$, $p< . 05$. This finding demonstrates the usefulness of this technology as a means for improving overall clinic efficiency.
DTIC
Health; Management Planning; Patients; Predictions

20040050661 Pittsburgh Univ., Pittsburgh, PA
University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy
Finn, Olivera J.; Sep. 2003; 119 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9352
Report No.(s): AD-A420915; No Copyright; Avail: CASI; A06, Hardcopy

Our Graduate Training Program in Breast Cancer Biology and Therapy is a multidisciplinary approach focused on an important disease. The overall philosophy of our training program is to identify qualified graduate students in the existing discipline- based training programs and to interest and educate them in the unsolved problems in breast cancer. The specific goals of our Program are: a) To recruit qualified predoctoral students to breast cancer related research; b) To educate students in the fundamental principles of breast cancer pathobiology and therapy; c) To monitor and evaluate the progress of the enrolled students and mentor them in their future career choices; d) To organize program activities, such as Seminar Series and Journal Clubs, for increased interaction of the student trainees with postdoctoral fellows and faculty interested in breast cancer. We have completed the last year of the training program in which we have closely followed our specific goals. Six students were trained. They published 4 manuscripts, three chapters and 20 abstracts on their research related to breast cancer.
DTIC
Cancer; Education; Mammary Glands; Therapy; University Program

20040050663 Johns Hopkins Univ., Baltimore, MD

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways

Kurman, Robert J.; Shih, Ie-Ming; Aug. 2003; 43 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0667

Report No.(s): AD-A420920; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study is to elucidate the pathogenesis of serous carcinoma by identifying the molecular genetic changes and preferentially expressed genes of different histological types of serous neoplasms. We hypothesize that the development of serous carcinoma proceeds along two main pathways: one is rapid progression from ovarian surface epithelium to high-grade serous carcinoma without well- established morphological precursors ('de novo' pathway) and the other is a gradual development from borderline tumors, to non-invasive micropapillary serous carcinomas then to low- grade carcinomas (stepwise pathway). The first pathway results in a high-grade neoplasm (conventional serous carcinoma) and the second leads to the development of a low-grade indolent tumor. Both types of carcinomas and the putative precursor lesions of invasive MPSC are characterized by distinctive molecular genetic alterations and specific gene expression. We identified that mutations in KRAS and BRAF genes characterized the development of low-grade serous carcinomas. Expression of HLA-G molecule and high level of chromosomal instability were confined to high-grade serous carcinomas. This project, designed to test our proposed model of diverse pathways in the pathogenesis of ovarian serous carcinoma, provides an etiologic basis for the other two projects.

DTIC

Cancer; Diagnosis; Pathogenesis; Tumors

20040050666 Cincinnati Univ., OH

Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis

Sherman, Larry S.; Sep. 2003; 49 pp.; In English

Contract(s)/Grant(s): DAMD17-00-1-0551

Report No.(s): AD-A420927; No Copyright; Avail: CASI; A03, Hardcopy

Malignant peripheral nerve sheath tumors (MPNST) are aggressive, difficult to treat tumors that occur in type I neurofibromatosis patients with an increased incidence compared to the general population. These tumors metastasize to a number of sites, including the lungs, and have a poor 5 year survival rate. We previously found that MPNSTs overexpress the CD44 tranmembrane glycoprotein and that reducing CD44 expression partially inhibits MPNST cell invasion. We also found that aberrant cD44 expression is linked to overexpression of the epidermal growth factor receptor (EGFR) in these cells through a Ras-independent mechanism. Here, we provide evidence that EGFR upregulates CD44 expression in the ST8814 cell line through a inechanism that depends on Src kinase and that Src kinase activity promotes MPNST invasion (Su et al., 2003a) . Furthermore, we show that MPNST cell invasion depends on an autocrine loop involving HGF, an HuF activating enzyme (HGFA), and c-Met, all of which are expressed by MPNST cells (Su et al., 2003b). Interestingly, c-Met - invasion, which may involve Src kinase, and c-Met autocrine activation occur independent of CD44, suggesting that c-Met and Src, but not CD44, are possible targets for anti-metastatic therapies to treat MPNSTs.

DTIC

Membranes; Metastasis; Neoplasms; Nerves; Sheaths; Tumors

20040050667 Pittsburgh Univ., Pittsburgh, PA

Ovarian Cancer Risk and Survival in BRCA 1/2 Carriers

Modugno, Francesmary; Sep. 2003; 16 pp.; In English

Contract(s)/Grant(s): DAMD17-00-1-0569

Report No.(s): AD-A420933; No Copyright; Avail: CASI; A03, Hardcopy

The goal of this project is to determine whether oral contraceptives (OCs) and parity are as protective against ovarian cancer in BRCA 1/2 carriers as they are for women in general (Specific Aim 1). The second goal is to determine whether there are survival differences between BRCA 1/2 1/2 carriers with ovarian cancer compared to women with sporadic disease (Specific Aim 2). The study employs a case-case design. We identified Jewish women with epithelial ovarian cancer. We genotyped these women for the 3 BRCA1/2 mutations found in Ashkenazi women. We compared oral contraceptive use and parity between carriers and non- carriers. We will also compare survival differences between the two groups.

DTIC

Cancer; Risk; Survival

20040050670 Georgetown Univ. Hospital, Washington, DC
Peripheral Benzodiazepine Receptor (PBR) in Human Breast Cancer
Papadopoulas, Vassilios; Apr. 2003; 136 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9200
Report No.(s): AD-A420939; No Copyright; Avail: CASI; A07, Hardcopy

The peripheral-type benzodiazepine receptor (PBR) is an 18 kDa high affinity cholesterol and drug binding protein, part of the aggressive human breast cancer cell phenotype in vitro. We report herein that in human biopsies elevated PBR expression is limited to certain cancers, such as those of breast, colon-rectum and prostate tissues, where elevated PBR expression is associated with tumor progression.
DTIC
Cancer; Mammary Glands

20040050672 Indiana Univ., Indianapolis, IN
Cyclin Dependent Kinase Inhibitors as Targets in Ovarian Cancer
Williams, Stephen D.; Oct. 2003; 64 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0725
Report No.(s): AD-A420941; No Copyright; Avail: CASI; A04, Hardcopy

The objective of this proposal is to develop gene therapy strategies that inhibit ovarian cancer cell growth and selectively improve sensitivity of ovarian cancer cells to chemotherapy and radiation. The proposal focuses on in vitro and in vivo 'proof-of- concept' studies of target discovery. Four highly interactive projects make up this proposal. We have identified key genes that may be effective targets in ovarian cancer therapy. The first three projects seek to identify alterations in these genes which, either alone or in combination with chemotherapy or radiation, will efficiently kill ovarian cancer cells. Project 4 will identify promoters that allow for high expression of our key gene(s) in ovarian cancer cells but minimal expression in normal tissues.
DTIC
Cancer; Enzyme Activity; Targets

20040050673 University of South Florida, Tampa, FL
Phosphoinositide 3-Kinase/AKT1 Pathway and Human Ovarian Cancer
Cheng, Jin Q.; Sep. 2003; 95 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-00-1-0559
Report No.(s): AD-A420944; No Copyright; Avail: CASI; A05, Hardcopy

During the last three years, we have demonstrated frequent activation (39%) of PI3K/AKT1 pathway in human primary ovarian cancer. The activation of this pathway is associated with late stage and high grade tumors, indicating that activation of PI3K/AKT1 plays a important role in ovarian tumor progression rather than initiation. Activation of - PI3K/AKT1 pathway induces malignant transformation and chemoresistance. Inhibition of this pathway by PI3K inhibitor or dominant negative AKT1 results in apoptosis and cell growth arrest as well as sensitizes ovarian cancer cells to cisplatin- induced cell death. We have also demonstrated that AKT targets ASK1/JNK/p38 pathway to promote cell survival. Further, we documented that farnesyltransferase inhibitor (FTI) and geranylgeranyltransferase I Inhibitors (GGTI) inhibit PI3K/AKT pathway to overcome chemoresistance in human ovarian cancer cells.
DTIC
Cancer

20040050676 Loma Linda Veterans Association for Research and Education, Loma Linda, CA
Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans
Baylink, David J.; Oct. 2003; 173 pp.; In English
Contract(s)/Grant(s): DAMD17-99-1-9571
Report No.(s): AD-A420947; No Copyright; Avail: CASI; A08, Hardcopy

The primary goal of the project funded by the U.S. Army is to identify genes which play an anabolic role in bone tissue and soft tissue function, particularly during regeneration, and to clarify the function of these genes. To accomplish this goal, we have proposed 3 technical objectives during the funding period. These 3 Technical% Objectives are as follows: A. Technical Objective 1: Studies proposed in the first technical objective are designed to employ state-of-the- art molecular

biotechniques to identify the gene located in mouse chromosome 1 that is involved in the regulation of peak bone density. B. Technical Objective 2: Our second technical objective has been focused on identifying the key genes that are involved in soft tissue repair/regeneration using inbred strains of mice as model systems. C. Technical Objective 3: The goal of our third technical objective is to identify and characterize novel genes, using ENU mutagenesis techniques and to elucidate the function of known genes that play a key role in the metabolism of bone and soft tissue.
DTIC
Bones; Fracturing; Genes; Maintenance; Wound Healing

20040050677 University of South Florida, Tampa, FL
Advanced Cancer Detection Center
Krischer, Jeffrey P.; Oct. 2003; 135 pp.; In English
Contract(s)/Grant(s): DAMD17-01-2-0056
Report No.(s): AD-A420948; No Copyright; Avail: CASI; A07, Hardcopy

The goals of the Advanced Cancer Detection Center include the discovery of molecular and genetic markers of cancer risk, the identification of individuals at high risk for cancer through screening and the testing of methods to prevent cancer.
DTIC
Cancer

20040050678 General Hospital Corp., Boston, MA
Mitochondria Polymorphism in Neurofibromatosis Type 1
Kurtz, Andreas C.; Nov. 2003; 47 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-00-1-0535
Report No.(s): AD-A420949; No Copyright; Avail: CASI; A03, Hardcopy

NF1 is characterized clinically by the development of plexiform and multiple cutaneous neurofibromas. There is no correlation between the numbers, size or prevalence of neurofibromas and the type of mutations in the NF1 gene, suggesting a role for genetic modifiers. Genetic polymorphism in mitochondria could cause variability in the observed tumor phenotype in NF1. Here, we analyzed somatic mitochondrial DNA mutations in cutaneous and plexiform neurofibromas to determine if certain mutations are found predominantly in tumors. We found somatic mutations in 9 of 18 plexiform neurofibromas and 9 of 19 cutaneous neurofibromas. All mutations detected were in the hypervariable D-loop region, where origin of replication and transcriptional regulators are located. Most mutations appeared to be homoplasmic in the tumors. In addition, pre-existing soamtic mtDNA mutations were detected in healthy skin of NF1 patients. Our analysis found that these pre-existing somatic mtDNA mutations accumulate in the tumor, suggesting a selection for the mutated mitochondria in all cell types present in neurofibromas. In a second ongoing set of experiments we analyze the proportion of germ line mitochondrial DNA variants in a cohort of 500 NF1 patients with high numbers and low numbers of cutaneous neurofibromas.
DTIC
Deoxyribonucleic Acid; Genetic Engineering; Mitochondria; Neoplasms; Polymorphism

20040050679 Cornell Univ., Ithaca, NY
Characterization of the Hen as a Model for Human Ovarian Cancer
Johnson, Patricia A.; Sep. 2003; 13 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-00-1-0560
Report No.(s): AD-A420950; No Copyright; Avail: CASI; A03, Hardcopy

Investigation of basic factors involved in malignant transformation of the ovary has been hampered by the lack of an appropriate animal model. Most animals, with the exception of the domestic hen, do not spontaneously develop ovarian cancer. The use of two related genetic strains, which differ in spontaneous incidence of ovarian cancer may reveal an important difference between the two strains that could underlie the differential susceptibility to ovarian cancer. We have examined many hens of both strains and have observed that the marked difference in incidence between the strains has been maintained. We have characterized the tumors in terms of ovalburnin expression as an indication of site or origin. We have also examined the expression of markers in the tumors. Our second approach was to manipulate the rate of follicle development and ovulation to examine the effect of repetitive ovulation on incidence. This experiment was not possible so we have instead focused on hormones related to ovulation. We found that the C strain has higher circulating levels of progesterone as compared to the K

strain. Finally, we are studying regulation of the tumor by investigating receptor expression in the tumors.
DTIC
Cancer

20040050680 Clemson Univ., SC
Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy
Chen, Wen Y.; Oct. 2003; 76 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9129
Report No.(s): AD-A420951; No Copyright; Avail: CASI; A05, Hardcopy

There were two specific tasks listed in the proposal i.e. development of HPRL-Gl29R as a PRL receptor antagonist and development of PRL BP as PRL sequester as potential breast cancer therapeutics. The conclusion from this project are that we have demonstrated that hPRL-Gl29R has promise to be used as a breast cancer therapeutic, but no hPRL- BP. We have found that hPRL-Gl29R is able to inhibit breast cancer cell proliferation via the induction of apoptosis. We further presented evidence that shows that mechanism of hPRL- G129R induced breast cancer cell apoptosis is the regulation of Bcl-2/Bax gene expression. Data obtained from mouse breast cancer model also support the notion that is inhibition of PRL activity in breast cancer inhibit it growth. In addition, we explored the possibility of using hPRL-Gl29R as a targeting molecule by fusing it with proven effective anti-cancer agents such as immuno-modulators (IL-2) and angiogenesis inhibitors (endostatin). During past three years, we have published 10 manuscripts directly related to this subject. In summary, we have demonstrated that hPRL-Gl29R is a true PRL receptor antagonist. Its anti-breast tumor effects were confirmed using both in vitro and in vivo assays.
DTIC
Cancer; Mammary Glands; Pituitary Hormones; Therapy

20040050681 Kennedy Krieger Research Inst., Baltimore, MD
Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities
Cutting, Laurie E.; Oct. 2003; 10 pp.; In English
Contract(s)/Grant(s): DAMD17-00-1-0548
Report No.(s): AD-A420953; No Copyright; Avail: CASI; A02, Hardcopy

The purpose of this research is oriented towards understanding the reading, language, and articulation deficits associated with Neurofibromatosis Type 1 (NF-1) and relating these deficits to the underlying pathophysiology of NF-1 as revealed by Magnetic Resonance Spectroscopy Imaging (MRSI). A second goal is to determine how differences in activation, as measured by functional Magnetic Resonance Imaging (FMRI), are linked to the cognitive/academic impairments associated with NF-1. A third goal is to further understand how T-2 weighted hyperintensities on Magnetic Resonance Imaging (MRI) scans are related to cognitive/academic impairments associated with NF-1. Each aim addresses the research in terms of pathophysiology and how cognitive/academic functioning of children with NF-1 compares to control groups when examined in both genetic (i. e. , sibling) as well as general population (both reading disabled and non-reading disabled) contexts. We hypothesize that abnormalities of NAA, Choline, or their ratios, will exists in the thalamusandwill correlate with language, reading, and articulation deficits in NF-1, defined by 'lowering' of the cognitive scores of each child with NF-1 relative to his/her unaffected sibling. For the second goal, we hypothesize that children with NF-1 will activate their brains similarly to reading disabled children during FMRI tasks. For the third goal, we hypothesize that reading, language, and articulation deficits will correlate with the number of brain locations with T2-weighted hyperintesities. Thus, neuroimaging permits the pursuit of furthering our understanding of how the NF-1 gene affects the brain in terms of basic neurobiologic factors (ultrastructural, physiological, and localization) as well as their impacts on cognition (reading, language, and articulation) in NF-1
DTIC
Brain; Disabilities; Imaging Techniques; Magnetic Resonance; Reading; Spectroscopy

20040050682 Massachusetts General Hospital, Boston, MA
Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin
McClatchey, Andrea I.; Oct. 2003; 35 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9495
Report No.(s): AD-A420954; No Copyright; Avail: CASI; A03, Hardcopy

Neurfibromatosis type 2 (NF2) is a familial cancer syndrome that features the development of nervous system tumors. The NF2-encoded protein, merlin, localizes to the membrane cytoskeleton interface, which is an unusual physical niche for a tumor suppressor. To generate an animal model for NF2 and to build the foundation for delineating the molecular function of merlin, we established a Nf2-mutant mouse strain through genetic engineering. Nf2+/- mice develop a spectrum of tumors that is distinct from that of their human counterparts, including osteosarcomas and hepatocellular carcinomas, which exhibit loss of the wild-type Nf2 allele. Embryos that are homozygous for a null Nf2 mutation fail to gastrulate, while chimeric embryos partially composed of Nf2-/-cells develop additional defects, including during cardiac development. Together, these observations indicate a requirement for merlin function in several different cell types in the mouse. The study of Nf2 function in these cell types formed the basis of this proposal. The following report describes our accumulating data that indicates an important and general role for NF2 function in cell differentiation. In addition, data from these and other studies in our laboratory point to a general role for merlin function in cell:cell communication in many cell types.
DTIC
Cells (Biology); Cytology; Mice; Suppressors; Tumors

20040050683 University of South Florida, Tampa, FL
Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer
Krischer, Jeffrey P.; Dec. 2003; 18 pp.; In English
Contract(s)/Grant(s): DAMD17-00-1-0062
Report No.(s): AD-A420955; No Copyright; Avail: CASI; A03, Hardcopy

Selenized yeast has also recently been shown to reduce lung cancer incidence and mortality in a population of skin cancer patients. Smokers and survivors of early stage lung and head and neck cancers have had a long period of promotion by carcinogenic agents on the bronchial epithelium resulting in morphologic and molecular alterations. We hypothesize that these morphologic and molecular alterations can be detected and modulated by chemopreventive agents. We have proposed a Phase IIA chemoprevention trial evaluating five different dose levels of selenium administered daily for 3 months in subjects at high risk for lung cancer with bronchoscopically documented dysplasia. Subjects will be entered to determine the effect of dose on the modulation of biomarkers in response to selenium supplementation as well as to measure selenium levels and modulation of glutathione peroxidase as a measure of drug effect. In addition to morphology, the surrogate endpoint biomarkers to be examined include apoptosis, p53 expression, K-ras mutation analysis, p16 methylation, and upregulation of hnRNP A2/B1. Successful completion of this study will support selenium supplementation as potentially beneficial therapy in preventing the progression of lung carcinogenesis as well as identify surrogate endpoint markers that appear to be modulated by selenium supplementation.
DTIC
Cancer; Lungs; Risk; Selenium

20040050684 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas
McCurdy, Rodney K.; Apr. 12, 2001; 156 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420956; HCA-34-01; No Copyright; Avail: CASI; A08, Hardcopy

On 1 January 2001, approximately 711,000 Medicare patients lost their Medicare+Choice (M+C) health maintenance organization (HMO) provider. The costly M+C regulatory environment is one reason cited by health plans for their mass exodus from the program. In response, 37 states have passed laws accepting industry-based accreditation as satisfying all or part of state oversight requirements. Texas, however, has not passed such legislation and prepares to increase state oversight on HMO operations. This content analysis study examined the current oversight models used by federal and state government regulators and compared these auditing tools to an industry-based accreditation survey. Results suggest that significant differences do exist among the current models (alpha =. 05) regarding the emphasis they place on the four oversight topics of finance, beneficiary protection and information, quality assessment and improvement, and plan management. By developing a M+C supplement to its current accreditation survey process, the NCQA could eliminate the differences in the models. This initiative would result in lower costs for both regulators and health plans. By law, the health plans would be required to pass along approximately $400,000 dollars in additional benefits to over 361,000 Texans participating in the M+C program.
DTIC
Costs; Health; Insurance (Contracts); Medical Services; Organizations

20040050685 University Health Network, Toronto, Ontario

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein

Penn, Linda Z.; Aug. 2003; 29 pp.; In English

Contract(s)/Grant(s): DAMD17-01-1-0434

Report No.(s): AD-A420957; No Copyright; Avail: CASI; A03, Hardcopy

Fundamental research clearly shows that the product of the c-myc oncogene is often expressed at elevated levels in a large number of breast cancers and is associated with poor prognosis, high-risk disease (for further detail, see our recent review (3). Indeed, Myc drives cell proliferation and can initiate as well as contribute to tumor development, as confirmed by both in vitro and in vivo models of breast cancer. The highly conserved regions of the Myc protein are thought to participate in protein:protein interactions. Importantly, blocking these sites can effectively inhibit Myc function and block breast carcinoma cell growth. Thus, Myc is a valid target for the development of novel therapeutics to inhibit mammary cells of malignant transformations in a specific and sensitive manner. This is the primary goal of this proposal. To achieve our goal, we are using the novel Repressed Transactivator (RTA) assay developed in collaboration with our lab (1). The RTA is an in vivo functional assay that will enable Myc-binding proteins and inhibitors of Myc:protein interactions to be identified and characterized. This experimental tool is conceptually similar to the conventional 'two-hybrid' technology but offers significant improvement. First, the RTA allows trans activator bait proteins like Myc, to be used in a two-hybrid approach to clone novel interactors. Second, the ability of the RTA to identify inhibitors of a given protein:protein interaction makes it particularly well suited for high throughput screening of protein:protein interactions and the identification of inhibitor compounds.

DTIC

Assaying; Cancer; Inhibitors; Mammary Glands; Peptides; Proteins

20040050686 Academy of Health Sciences (Army), Fort Sam Houston, TX

The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center

Parker, Robert O.; Jun. 20, 2000; 104 pp.; In English; Original contains color illustrations

Report No.(s): AD-A420958; HCA-38-01; No Copyright; Avail: CASI; A06, Hardcopy

Over the years, South Texas Veterans Health Care System (STVHCS) has increased outpatient care; as a result, bed days of care (BDOC) decreased over the last ten fiscal years. Admissions, however, only decreased over the first eight-year period. In FY 1999 and FY 2000, there was a noticeable increase in admissions. The Chief of Staff questioned whether the recent increases in the number of admissions were due to the increased utilization of Vietnam Era Veterans (VEV). He also was interested in knowingwhat the likely impact and affect on utilization, admissions, BDOC and cost for treatment of VEV over the next 5 years. This retrospective study uses descriptive statistics, inferential statistics, and trend analysis to observe, describe, explain, predict, test, and evaluate hypotheses associated with the relationship between non-VEV and VEV admissions. The results from this will be used to assist in developing a forecasting methodology using a best curve fit model.

DTIC

Medical Services; Mental Health; Personnel; Vietnam

20040050687 Academy of Health Sciences (Army), Fort Sam Houston, TX

An Analysis of Emergency Department Overcrowding at The Johns Hopkins Hospital

Bragg, Duane M.; Jun. 20, 2001; 38 pp.; In English; Original contains color illustrations

Report No.(s): AD-A420959; HCA-34-01; No Copyright; Avail: CASI; A03, Hardcopy

Health care administrators face numerous challenges in their effort to deliver high quality, cost effective care. These challenges have merged together to create the additional problem of emergency department (ED) overcrowding, a new problem for administrators and the health care industry. The Johns Hopkins Hospital is just one of many hospitals experiencing ED overcrowding. The purpose of this study was to identify and analyze different factors that may affect ED overcrowding and develop an effective statistical model for predicting future occurrences of ED overcrowding and developan effective statistical model for predicting future occurrances of ED overcrowding. The predictive full model is a statistically significant model with a R2 of .683 with $F(46, 81) = 3.802$, $P<.001$. This was an initial attempt at developing a predictive model for ED overcrowding. It is clear that a more sophisticated model is needed to identify key trigger points and provide a better tool for predicting when ED overcrowding will occur. The analysis shows that occupancy rate definitely influences whether or not an institution experiences ED overcrowding.

DTIC

Emergencies; Hospitals; Medical Services

20040050689 Cedars-Sinai Medical Center, Los Angeles, CA
Expression Profiling of Cell Lines Expressing Regulated NF2 Transcripts
Pulst, Stefan M.; Sep. 2003; 18 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-01-1-0703
Report No.(s): AD-A420961; No Copyright; Avail: CASI; A03, Hardcopy

Expression profiling is a powerful novel technique to examine changes in the expression of a large number of genes at the same tune. Different phenotypic states of a cell can be translated into specific gene expression signatures. As a complement to yeast two-hybrid studies we proposed using gene expression profiling to determine changes in gene expression as a function of expression of the neurofibromatosis-2 (NF2) gene in schwannoma cells. The strength of our approach is that we will not use tissues from patients, but will concentrate on cell lines in which NF2 expression can be controlled through the Tet/On system. In this system, treatment of cells with tetracycline (tet) induces expression of a tet-regulated gene, which in turn regulates the expression of the gene of interest. We have now generated several cell lines that express NF2 in a regulated fashion. The parent lines are RT4 schwannoma cells and mouse embryonic fibroblasts. A time course for NF2 expression has been established. A total of four cell lines have been tested on microarrays to detect expression changes. Surprisingly, no changes common to expression of isoform 1 and 2 have been detected so far. A manuscript describing our first set of experiments is in press.
DTIC
Cells (Biology); Genes; Tetracyclines

20040050690 Queens Univ., Kingston, Ontario
Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis
Wojcik, Joanna; Jul. 2003; 73 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-98-1-8330
Report No.(s): AD-A420962; No Copyright; Avail: CASI; A04, Hardcopy

In the normal breast, hepatocyte growth factor (HGF), also known as scatter factor, is expressed primarily by stromal cells, while epithelial cells express the HGF receptor, Met. Thus, epithelial cells exhibit a tight paracrine loop regulating HGF-dependent responsiveness. In invasive human breast carcinomas, HGF and Met are frequently over-expressed, thereby establishing an autocrine HCF/Met signaling pathway and promoting tumor cell invasion. However, the mechanisms leading to aberrant expression of HGF in carcinoma cells are not known. We previously demonstrated a co-operative effect of c-Src tyrosine kinase and Stat3 in the activation of HGF transcription in mammary carcinoma cells. In the present report, we have shown that non-malignant breast epithelial cells over-expression activated c-Src and Stat3 exhibit increased activation of Stat3, HGF transcription, and cell scattering. Mutational analysis of the HGF promoter revealed a novel Stat3 binding site at nt -95, which is required for the c-Src/ Stat3 co-operative effect. Our results delineate a novel c-Src/Stat3-dependent mechanism that regulates HGF transcription in breast carcinomas. This study could lead to novel strategies inhibition of HGF gene expression in tumor cells with minimal effects on normal HGF/Met function.
DTIC
Cancer; Genetics; Mammary Glands; Metastasis; Transferring

20040050691 Wayne State Univ., Detroit, MI
Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer
Everson, Richard B.; Feb. 2003; 157 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-98-1-8352
Report No.(s): AD-A420963; No Copyright; Avail: CASI; A08, Hardcopy

For drugs that interact with DNA, measures of DNA damage can assess the intracellular availability of active drug at a critical molecular target. Measurements of DNA damage should reflect the integrated effect of all resistance factors, including both recognized mechanisms and uncharacterized mechanisms. Thus, molecular measures of DNA damage could provide an important tool for elucidating the time course of complex changes in resistance factors. Motivated by a recent clinical trial that demonstrated better survival when the interval between induction chemotherapy and high dose therapy was prolonged, this project?% is using measures of DNA damage to determine whether induction chemotherapy causes transient changes in resistance. Findings indicate cyclophosphamide, cis-platin, and BCNU each produce DNA damage that %an be measured in a dose dependent manner. Using a laser scanning cytometer, individual cells can be identified on slides. The characteristics of the individual cells (e.g., the presence of markers for normal or cancer cells) and cytoplasmic features (e.g. markers for apoptosis or enzymatic or other factors associated with resistance to chemotherapy) can be characterized by

immunohistochemistry. Assays for DNA damage can be conducted in the same cells and associations between DNA damage and cytoplasmic features determined at the individual cell level.
DTIC
Adducts; Cancer; Deoxyribonucleic Acid; Dosage; Dosimeters; Mammary Glands; Therapy

20040050692 Academy of Health Sciences (Army), Fort Sam Houston, TX
Optimization and Management of Naval Hospital Bremerton's Military-Medicare Population by Market Analysis of the Naval Hospital Bremerton Empanelled Population
Coefield, Ocie M.; Apr. 30, 2001; 45 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420967; HCA-32-01; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this research project was to determine whether Naval Hospital Bremerton could meet the service demands for the care of the over 65 military-Medicare eligible population within the catchment area. If not, what changes in service could be made to better accommodate Bremerton s over 65 beneficiary population without adversely effecting the service to all other beneficiary categories. As a result of this study, several recommendations are forwarded. First, one of the pediatric department provider positions should be terminated and the position should be shifted to the primary care department. Second, all providers in the primary care department should be empanelled. Third, ensure that providers are empanelled in a manner that considers patient acuity and/or provider utilization rates. Fourth, use any additional capacity to first enroll any remaining eligible beneficiaries under 65 that are not currently enrolled. Fifth, allow the staff a grace period. The enrollment of additional military-Medicare beneficiaries should be delayed by at least three months from the expected turn-on date of the Composite Health Care System II. This will give the providers time to become familiar with new systems and practices.
DTIC
Hospitals; Medical Services; Populations

20040050693 Academy of Health Sciences (Army), Fort Sam Houston, TX
Staying Prepared for the Joint Commission: Restructuring for Continuous Accreditation, Reynolds Army Community Hospital
Lindsay, Richard S.; May 17, 2001; 68 pp.; In English
Report No.(s): AD-A420968; HCA-24-01; No Copyright; Avail: CASI; A04, Hardcopy

As with all other facets of the healthcare arena the accepted measurement of quality is constantly evolving. The Joint Commission on the Accreditation of Healthcare Organizations and consequently, the U.S. Army Medical Department are measuring a great deal of a hospitals effectiveness and quality of services based on Performance Improvement. Performance Improvement is grounded in using the collection and analysis of quantitative data to be able to allow the hospital leadership the information that is required to make informed and intelligent decisions concerning the functioning of the hospital. In order to collect, analyze, interpret, and communicate that data, an efficient and streamlined committee structure is essential. The existing committee structure should be reengineered to ensure that the required committees and functions, outlined in the Joint Commission on the Accreditation of Healthcare Organizations and U.S. Army Medical Department rules and regulations, are integrated into the new structure. This is just the first step that is needed to allow Reynolds Army Community Hospital to evolve along with the changing standards. This will change the mindset of the hospital employees and help them understand that business practices of the 1990 s are no longer sufficient in today s healthcare environment. We must constantly strive to improve the quality of services that are provided by our facility.
DTIC
Hospitals; Medical Services

20040050695 Academy of Health Sciences (Army), Fort Sam Houston, TX
Implementation of Provider Perspectives Resulted in Proper Health Care Resource Utilization
Mclean, Hugh A., Jr; Apr. 13, 2001; 100 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420979; HCA-4-01; No Copyright; Avail: CASI; A05, Hardcopy

The Department of Defense Military Health System (MHS) is under constant pressure to decrease costs and increase operational efficiencies. One of the methods to decrease these inefficiencies is through the use of provider profiling systems. One such system is Provider Perspectives. This study shows that Provider Perspectives significantly decreased Emergency Room utilization and subsequently increased the usage of primary care clinics at Martin Army Community Hospital and Winn Army Community Hospital. A significant monthly cost avoidance of $49,000 was shown for Winn. Although, Martin Army Community Hospital showed an increase in monthly operating costs, access to health care increased. This study points out that

although Provider Perspectives had a significant affect on usage and cost avoidance, it had a minimal affect on the two quality measures studied: cervical screenings and mammograms.
DTIC
Health; Management Planning

20040050696 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital
Moore, R. C.; Apr. 13, 2001; 52 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420980; HCA-16-01; No Copyright; Avail: CASI; A04, Hardcopy

Moncrief Army Community Hospital (MACH) is a Medical Treatment Facility(MTF) located on Fort Jackson, South Carolina. MACH falls within Health Service Region 3 of the TRICARE nationwide system. MACH is responsible for providing care to active duty soldiers permanently assigned to Fort Jackson, their family members, eligible retirees, and active duty soldiers temporarily assigned to Fort Jackson for Basic Combat Training, Advanced Individual Training, and other service schools for enlisted soldiers and officers. The Family Health Clinic (FHC) is MACH s primary care clinic for permanent party soldiers, their family members, eligible retirees and their family members. Like most clinics in the Army Medical Department (AMEDD), the MACH FHC is responsible for capturing data forpatient visits and telephone consults in the Composite Health Care System (CHCS) and the Ambulatory Data System (ADS). Historically, the FHC has submitted incorrect data which, inturn, fails to accurately reflect the volume and acuity mix actually seen by FHC providers. The purpose of this project was to identify areas of data collection and coding compliance that were in need of improvement in MACH s FHC and provide it with a reporting tool coupled with an education process to improve those deficient areas.
DTIC
Diagnosis; Health; Hospitals; Management Planning; Productivity

20040050697 Academy of Health Sciences (Army), Fort Sam Houston, TX
U.S. Army Nursing Readiness: A Field Administration of the Readiness Estimate and Deployability Index (READI) in the North Atlantic Regional Medical Command (NARMC)
Murdock, Peter H.; May 22, 2001; 40 pp.; In English
Report No.(s): AD-A420981; HCA-9-01; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this observational study was to use the Readiness Estimate and Deployability Index (READI) to estimate, compare and describe the states of deployment readiness in active and reserve component Army Nurse Corps (ANC) officers affiliated with the North Atlantic Regional Medical Command (NARMC). Army Nurses must be ready to provide nursing care indeployed environments that are characterized by austere and dangerous conditions, high patient variability, and limited technology. The READI is a 105-item survey that measures self-report of cognition, affect, perception of motor skills and physical functioning related to six dimensions of nursing readiness: clinical nursing competency, operational competency, survival skills, personal and psychological readiness, leadership and administrative support, and group integration and identification. In this study, a random sample of active (n = 188) Army Nurses who were assigned to the NARMC or reserve (n = 56) Army Nurses who are assigned to units that deploy to NARMC medical treatment facilities (MTFs) voluntarily responded to a mail administration of the READI. Comparative results of scaled and re-scaled items were depicted on specially developed and innovative graphic panoramic displays (GPDs) following the quantitative graphic principles outlined by Professor Edward Tufte of Yale University. Results revealed that active nurses reported slightly higher levels than reserve nurses in clinical nursing competencies, and operational competency, and significantly greater competency in survival skills. This study provides further evidence of the utility of depicting READI results in GPD format to identify training opportunities for both active duty and reserve component ANC officers. Future administrations of the READI are needed to measure nurse readiness before, during and after deployment, and in different
DTIC
Atlantic Ocean; Health; Management Planning

20040050698 Academy of Health Sciences (Army), Fort Sam Houston, TX
The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time
Coleman, Barbara A.; Apr. 13, 2000; 81 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420982; HCA-32-01; No Copyright; Avail: CASI; A05, Hardcopy

Managed care organizations (MCO) must make every effort to improve the effectiveness of claims processing and reporting or they will risk the loss of member and provider satisfaction and ultimately lose their ability to remain solvent. The status of claims administration has been elevated in light of the fact that somewhere between 73 and 93 percent of all premium dollars are paid out for medical care in capitation and claims payments. An effective MCO will use claims processing data to manage the cost of health care on a case basis and in aggregate. Designing appropriate claims reports is essential to a well-managed healthcare organization s ability to effectively forecast liability trends and institute corrective steps. When TRICARE Managed Care Support Contracts were brought on-line there was no longer a direct contractual relationship between the FI and the government. Consequently, the Departmentof Defense was no longer at risk for either the expenditure of healthcare dollars or the adjudication of claims. Unfortunately, TMA continued to monitor the MCSC as if the government maintained the risk and was overly prescriptive with literally thousands of edits that slowed the claim process down. TRICARE has had claims processing timeliness and accuracy issues since its inception due in large part to the numerous eligibility categories, differing cost shares and benefits, the three health plan options (Prime, Extra, and Standard), and its reliance on data exchanges. TRICARE Management Activity (TMA) recognized that failure to respond immediately to beneficiary and provider concerns regarding claims processing would result in the loss of both patients and network providers. TMA tightened the timeliness standard of 75 percent of claims processed within 21 days to 95 percent of clean claims within 30 days and 100 percent in 60 days. This case study was conducte

DTIC

Claiming; Health; Management Planning; Simplification

20040050699 Academy of Health Sciences (Army), Fort Sam Houston, TX

An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center

Buckner, Jason E.; Mar. 30, 2001; 59 pp.; In English; Original contains color illustrations

Report No.(s): AD-A420983; HCA-33-01; No Copyright; Avail: CASI; A04, Hardcopy

In October, 2000, under the guidance of Colonel Jay Ellis, Chief Consultant for Anesthesiology to the Air Force Surgeon General, the researcher began to evaluate the costs and benefits associated with purchasing anesthesia automated record keepers (AARKs) for Wilford Hall Medical Center in San Antonio, Texas. Wilford Hall's anesthesia department was devoid of any meaningful information management system, making theft and waste possible, and making research and drug management nearly impossible. Preliminary investigation showed that the Department of Defense (DoD) had evaluated potential AARKs and had chosen to endorse the Anesthesia Information Management System (AIMS) by LifeCare Technologies, thus the focus of the study was a cost-benefit analysis of AIMS, to determine whether or not the benefits would justify the exorbitant costs of its purchase and continued utilization. The literature indicated that savings could be realized in the form of reduced costs of anesthetics, practice improvements through outcomes research, and fewer medicolegal losses. Obstacles include staff resistance and systems support and compatibility, the latter of which caused AIMS to fail at the original DoD test site, Brooke Army Medical Center. Since the DoD pays military medicolegal losses, this benefit would be realized only from the perspective of the DoD; WHMC s budget would not change. This led to evaluation from both of these perspectives. Each cost and each benefit required its own form of investigation, most notably the benefit of increased third party collections. Several of these were found to hold uncertain values, thus scenario and sensitivity analyses were performed on the five most critical elements. The results of best estimates were as follows: From the WHMC perspective, the 10-year net present value (NPV)= - $82,633, with a payback period of 8.210 years; from the DoD

DTIC

Anesthesia; Costs; Health; Management Planning

20040050703 Academy of Health Sciences (Army), Fort Sam Houston, TX

Referral Process Improvement: A Study of the Efficiency and Tracking Processes for In-house Referrals at Blanchfield Army Community Hospital

Hoiden, Timothy J.; Apr. 2, 2002; 58 pp.; In English

Report No.(s): AD-A420987; HCA-12-02; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this study was to evaluate the referral process from primary care managers (PCMs) to specialists at Blanchfield Army Community Hospital (BACH). Specifically, the study revealed key elements of an ideal referral process from the literature review and compared those elements with the referral process at BACH. Indicators were then developed to determine the efficiency of BACH s referral process. Statistical significance was found to exist in both the developed benchmarks (n = 1885) of each indicator at the 95% confidence interval. Finally, recommendations for improving the referral

process were made based on the detailed systems and data analyses conducted. These recommendations focused on PCMs management of their impaneled patients and the referral process itself.
DTIC
Health; Hospitals; Management Planning

20040050705 Academy of Health Sciences (Army), Fort Sam Houston, TX
Overseas Medical Screening
Elgin, Stephen C.; Jun. 2002; 33 pp.; In English
Report No.(s): AD-A420993; HCA-32-02; No Copyright; Avail: CASI; A03, Hardcopy

This study analyizes the performance of the Navy's Overseas Medical Screening process in regards to the European Theater. The data reviewed are from personel early returned due to a medical condition, repetive medivacs for the same condition, and medical board proceedings to determine whether personel and their dependants are transfering with conditions which existed prior to transfer and would have normally caused their transfer not to occur. The time periods for this study are various between the years 1999 and 2002 due to data availability, and are from U.S. Naval Hospital's Rota, Spain and Naples, Italy. The overseas medical screening process for all three military services are also reviewed as USNH Naples is the primary MTF for the NATO Command, AFSOUTH, which has all three services represented. Literature research was also conducted to determine whether GS CONUS-hired employees must be medically screened prior to transfer overseas. The data collected duing the study also determined whether a negative impact on overseas MTFs is occuring by the quality of GS employee medical screeingn being conducted.
DTIC
Health; Management Planning

20040050706 Academy of Health Sciences (Army), Fort Sam Houston, TX
TRICARE Plus: A Cost, Capacity and Enrollment Analysis
Haney, Michael L.; May 2002; 37 pp.; In English
Report No.(s): AD-A420994; HCA-32-02; No Copyright; Avail: CASI; A03, Hardcopy

This study looks at the TRICARE Plus (TP) impact on the cost of primary care (PC) within the Naval Hospital Pensacola (NHP) catchment area by determining current costs and NHP s TRICARE Prime enrollment capacity. Recommended TRICARE Plus options are provided based on NHP s and the Military Health System (MHS) costs and capacity. NHP s fiscal year 2001 (FY01) PC capacity was nearly 50 percent, which equated to over 45,000 unfilled visits. NHP s and the MHS PC costs in FY01 for the Pensacola catchment area were $17, 357, 609 and $23,753,608 respectively. Increasing enrollment will reduce these costs. Over 28,000 eligible beneficiaries in the Pensacola catchment area are not enrolled in TRICARE Prime at NHP. Recapturing a portion of these beneficiaries could result in $2.25 million savings for the MHS and decrease the cost of a NHP PC visit to $44. Specific enrollment strategies will determine actual savings. It is recommended that NHP recapture all Active Duty Dependents (ADD) currently enrolled in the Civilian Provider Network (CPN) while actively enrolling TRICARE Plus eligibles. By FY06, ADD Civilian Prime Network recaptures should increase NHP s TRICARE Prime enrollment nearly 4500. Additionally, TRICARE Plus enrollment could increase by over 3000. Estimated annual cost savings for NHP and the MHS would be $90 thousand and $2.25 million respectively.
DTIC
Cost Analysis; Health; Management Planning

20040050707 Academy of Health Sciences (Army), Fort Sam Houston, TX
Improving the Quality of Medical Coding Data at Naval Hospital Bremerton
Kluegel, Bradley C.; Nov. 2002; 121 pp.; In English
Report No.(s): AD-A420996; HCA-32-02; No Copyright; Avail: CASI; A06, Hardcopy

The effectiveness of a health care organization's coding function is directly associated with the effectiveness of the organization. Health care organizations use information derived from the coding function in medical record completion, claims processing, organizational decision-making, and in many other important activities. Faulty structures and processes in medical coding may result in flawed outcomes, which in turn adversely affect organizational effectiveness. The purpose of this project is to assess Naval Hospital Bremerton's coding function and make recommendations to the organization s leadership about potential redesign of the function. The project employs a case study design that relies upon various sources of data. Data are gathered through structured interviews conducted at several healthcare facilities in the Puget Sound area of Washington State. The project s recommendations result from a synthesis of data analysis and the literature review. Recommendations include

consolidation and reorganization of the current coding function, adding additional coding staff, re-focusing training efforts, and improving auditing practices. The study also calls for increased provider and clinical leadership involvement to emphasize the importance of coding and documentation accuracy to support workload accountability and, ultimately, to improvepatient care.
DTIC
Coding; Health; Hospitals; Management Planning

20040050708 Academy of Health Sciences (Army), Fort Sam Houston, TX
Assessing the Value of Professional Coders in Ambulatory Healthcare Systems
Drish, Edward W.; Jun. 2002; 41 pp.; In English
Report No.(s): AD-A420997; HCA-32-02; No Copyright; Avail: CASI; A03, Hardcopy

Information derived from accurate, current, and complete patient encounter data is an invaluable resource for health care organizations today. Used to support many critical decision-making processes, organizations must strive to produce the highest-quality encounter data possible. This study examines the value of employing certified professional coders to collect encounter data. A comparison of two coding scenarios was conducted: coding completed by health care providers and coding completed by professional coders. Samples of Evaluation and Management codes applied by providers and coders were categorized into frequency distributions and the average standard deviations of these distributions were compared. As much less variation was found among the group of professional coders, it was concluded that they produced more reliable results and, therefore, improved coding data quality. In addition to this comparison, two previous studies that assessed the value of coders in ambulatory health care systems are included. These studies indicate that professional coders produce significant improvements in coding data quality.
DTIC
Coders; Health; Management Planning; Medical Services

20040050710 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune
Meeting, John G.; Jul. 2002; 61 pp.; In English
Report No.(s): AD-A420999; HCA-32-02; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this study was to provide a comprehensive analysis of outpatient pharmacy utilization to identify ways to reduce revised financing costs at Naval Hospital CampLejeune (NHCL). The study employed data from both the pharmacy data transaction service (PDTS) and a random survey to determine the utilization characteristics, behaviors, and perceptions of NHCL beneficiaries. Results showed that while managed care support contract(MCSC) retail network pharmacies filled only 7.5% of all NHCL prescriptions, they accountedfor 19.3% of all outpatient pharmacy costs. Fifty-six percent of the MCSC pharmacy utilization by TRICARE Prime beneficiaries occurred in the local Jacksonville area, with nearly 29% of that utilization consisting of drugs carried on the NHCL formulary. Further analysis of self-reported beneficiary data showed that the number of referrals to a civilian network care provider was the most significant predictor of MCSC pharmacy utilization ($p < .001$). When asked the specific reason for MCSC pharmacy utilization, only 11% selected reasons related to service quality or knowledge of benefits, while 43% indicated reasons related to convenience, and 73% stated that their medication was not listed on the NHCL formulary. This indicates that the most effective means of reducing pharmacy revised financing costs would be to develop strategies aimed at improved convenience and proper formulary management.
DTIC
Health; Hospitals; Management Planning; Pharmacology

20040050713 JAYCOR, San Diego, CA
A Health Hazard Assessment for Blast Overpressure Exposures
Stuhmiller, James H.; Sep. 2003; 63 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-96-C-6007
Report No.(s): AD-A421008; No Copyright; Avail: CASI; A04, Hardcopy

This report describes progress toward understanding and quantifying injury arising from impact or impulsive loading to the body from blast, projectiles, or vehicle restraint systems.
DTIC
Exposure; Hazards; Health; Medical Science; Overpressure; Weapon Systems

20040050714 Johns Hopkins Univ., Baltimore, MD
Corneal Damage From Mid-Infrared Laser Radiation
McCally, Russell L.; Apr. 2003; 14 pp.; In English
Contract(s)/Grant(s): DAMD17-02-C-0072
Report No.(s): AD-A421010; No Copyright; Avail: CASI; A03, Hardcopy

The research performed under this contract directly supports the U.S. Army Medical Research and Materiel Command (USAMRMC) mission to assess the health effects and hazards of non-ionizing electromagnetic radiation from laser systems. The data obtained will support evaluation of current permissible exposure limits promulgated by TEMED 524 and the ANSI Z-136 laser safety standards. The research addresses three main hypotheses: 1) Damage from 1.55 micro radiation is thermal. 2) Damage from sequences of pulses is cumulative and is correlated by a power law relating the threshold irradiance to the number of pulses in the sequence, and 3) exposures only slightly above the damage threshold for the comeal epithelium will result in damage to the corneal endothelium for these penetrating wavelengths. The hypotheses will be tested by: 1) determining comeal epithelial damage thresholds for single- and multiple-pulse exposures as functions of irradiance, exposure duration, and beam size for wavelengths near 1.55 pm. 2) developing and validating damage models for these wavelengths, and 3) determining thresholds for endothelial damage for single-pulse exposures as functions of irradiance, exposure duration, beam size, and position on the cornea and investigating the healing response for exposures above the epithelial damage threshold.
DTIC
Cornea; Damage; Electromagnetic Radiation; Laser Beams

20040050715 Wayne State Univ., Detroit, MI
Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3
Raz, Avraham; Nangia-Makker, Pratima; Shekhar, P. V.; May 2003; 54 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-00-1-0497
Report No.(s): AD-A421011; No Copyright; Avail: CASI; A04, Hardcopy

Based on our preliminary findings involving the recombinant galectin-3 and low, high and null galectin-3 expressing breast cancer cells, we hypothesized that galectin- 3 is an angiogenic stimulator and plays an important role in the progression of breast carcinoma as an alternate signaling pathway for the carbohydrate recognition. The purpose of the present study is to determine if a) galectin-3 has a role in breast cancer progression and angiogenesis and b) if MOP is able to inhibit progression/metastasis and angiogenesis in breast cancer. Our results indicate that galectin-3 redistributed from luminal to basal epithelial cells during breast cancer progression and might play a role in the invasiveness of certain cancer cells by interacting with stromal cells. Using a novel 3- - dimensional in vitro co- culture system that permits growth and functional organization/differentiation of preneoplastic human breast epithelial cells and endothelial cells , we demonstrated that galectin-3 is an important mediator of epithelial-endothelial cell-cell interactions. Blocking galectin-3 expression by anti-sense transfection of galectin-3 in MDA-MB-435 cells resulted in loss of tumorigenic potential and transformed phenotype. Modified Citrus Pectin (MOP) is able%to reduce tumor size, microvessel density as well as metastatic potential of MDA-MB-435 cells injected in nude mice. Administration of MOP at a later time i.e. after removal of primary tumor did not inhibit metastasis.
DTIC
Cancer; Carbohydrates; Cells (Biology); Endothelium; Mammary Glands; Proteins

20040050716 Fox Chase Cancer Center, Philadelphia, PA
Targeting Breast Cancer With Anti HER2/neu Diabodies
Weiner, Louis M.; Jul. 2003; 44 pp.; In English
Contract(s)/Grant(s): DAMD17-98-1-8307
Report No.(s): AD-A421012; No Copyright; Avail: CASI; A03, Hardcopy

The objective of this proposal is to develop new therapeutic reagents for breast cancer using diabody-based molecules with affinity for HER2/neu for the radioimmunotherapy (RAIT) of breast cancer. The first Technical Objective (T.O.) has focused on the optimization of the production of the selected diabody and the identification of the optimal radionuclide and labeling strategy for diabody- based RAIT. This T.O. also has involved an investigation into the impact on diabody targeting of factors likely to be encountered in a clinical setting. These include the degree of antigen density, the route (i.v. bolus or continuous infusion) and frequency of administration, the presence of disseminated disease, and the effect of antigen expression on normal tissues. Completion of these experiments has set the stage for proceeding to the clinical evaluation of diabody-based targeting of breast cancer in our second Technical Objective. Current experiments demonstrate the feasibility

and efficacy of alpha particle based radioimmunotherapy wherein the radionuclide is conjugated to a chelated diabody molecule. The clinical component of this proposal will entail a Phase I radioimmunoimaging and radioimmunoguided surgery trial to elicit information on the dosimetry, specificity and tumor penetration properties of radiolabeled C6.5 diabody, and will assess the RAIT potential of this molecule.
DTIC
Cancer; Chemotherapy; Mammary Glands; Radioactive Isotopes

20040050717 Health Research, Inc., Buffalo, NY
Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer
Cowell, John K.; Sep. 2003; 34 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-98-1-8294
Report No.(s): AD-A421013; No Copyright; Avail: CASI; A03, Hardcopy

Loss of heterozygosity in the 1p3l region is a common event in breast cancer development suggesting the location of a tumor suppressor gene. Using a combination of molecular cloning and bioinformatics strategies, we identified 18 known genes and 16 predicted genes within the critical region of 1p31. Molecular analysis of selected genes such as TTC4 and the progesterone receptor (PTGFR) did not identify nonsense mutations in breast tumors. A comparison of expression profiles for the 18 known genes between tumor and normal tissue demonstrated seven which wee down regulated in breast cancer. No nonsense mutations were found in these genes although protein altering missense mutations were detected specifically in tumor DNA compared with the paired normal tissue. Verification of the rolf of any of these genes in breast cancer will require functional assays. During the course of these analyses, we also identified the CLCA2 gene in 1p31 which was down regulated in 50% of breast cancer and cell lines. Bisulfite secuencing showed that promoter methylation was the cause of the inactivation of this gene and treatment with 5-azacytidine could reactive it in the MDA-NB435 and MDA- MB231 cell lines. These results strongly suggest that CLCA2 could be a critical gene in 1p31 for breast cancer development.
DTIC
Cancer; Chromosomes; Genes; Isolation; Mammary Glands

20040050718 Pittsburgh Univ., Pittsburgh, PA
Mitochondrial Mechanisms of Neuronal Injury
Reynolds, Ian J.; Nov. 2003; 132 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-98-1-8627
Report No.(s): AD-A421015; No Copyright; Avail: CASI; A07, Hardcopy

This project is focused on understanding the mechanisms of neuronal injury in acute and chronic neurodegenerative diseases. In particular, we are interested in the role that mitochondria play in both the maintenance of neuronal viability and in the execution of neurons following injurious stimuli. Our prior studies have shown that mitochondria are an essential target for calcium overload in excitotoxic neuronal injury. We have developed a model of neuronal injury in an organotypic slice preparation that should provide insight into mitochondrial events in dopaminergic neurons. We hope that this will allow the study of mitochondrial physiology in neurons that are selectively vulnerable in Parkinson's disease. In addition, we are investigating the properties of mitochondrial trafficking in neurons, which, together with an in situ study of mitochondrial DNA replication, will start to provide an unprecedented insight into mitochondrial biogenesis, movement and turnover. We believe that an understanding of the long- term properties of mitochondria in neurons will provide information that is critical to the full appreciation of the mechanisms of neuronal injury in chronic neurodegenerative disease.
DTIC
Cells (Biology); Deoxyribonucleic Acid; Diseases; Dopamine; Injuries; Mitochondria; Nervous System; Neurophysiology

20040050719 Mount Sinai School of Medicine, New York, NY
A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer
Weltz, Christina R.; Oct. 2003; 28 pp.; In English
Contract(s)/Grant(s): DAMD17-98-1-8128
Report No.(s): AD-A421016; No Copyright; Avail: CASI; A03, Hardcopy

The goals of the study are to evaluate the role of paravertebral blocks regional anesthesia in patients undergoing operative treatment of breast cancer. Experience to date has shown that this anesthetic modality is safe and effective, and associated with excellent post operative pain control and minimization of nausea and vomiting associated with general anesthesia. Using a

prospective randomized trial carried out at two institutions, we propose to measure quality of life variables including pain, postoperative nausea an vomiting, mood, and functional status in patients undergoing breast surgery with the traditional techniques of general anesthesia versus the region technique of paravertebral block. The preliminary phase of this trial, which establishes the safety and efficacy of performing the block technique, is complete. We are currently in the study portion of the trial and have consented and randomized a total of 35 patients at one institution thus far. Outcomes and study instruments are detailed in the report. Our collaborating institution, the Mayo Clinic Jacksonville, is awaiting final institutional approval in order to begin recruiting patients.
DTIC
Anesthesia; Cancer; Health; Mammary Glands

20040050720 Brooke Army Medical Center, Fort Sam Houston, TX
Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients
Montalvo, Alfredo; Jun. 2003; 6 pp.; In English
Contract(s)/Grant(s): MIPR-3GD3DY3086
Report No.(s): AD-A421017; No Copyright; Avail: CASI; A02, Hardcopy

As of 19 December, the research team has submitted the research proposal to the Brooke Army Medical Center Institutional Review Board (IRB). The IRB approved the proposal. Consent forms created in English were then translated into Spanish. Instrument packets were created in English and translated into Spanish by a certified translator. All instruments were professionally printed. The consultant for the project was hired and telemedicine equipment was evaluated by the consultant based on clinical requirements defined by the research team. The Starview 2000 ProSeries II Videophone was selected for this study and 25 units in hardened carry cases were purchased from the vendor. These telemedicine units were configured for ease of patient use. All units have arrived and are in the process of being tested before being given to patients. The research assistant (RA) was hired and will begin work full-time on the project starting Jan 5, 2004. He worked part-time during the initial phase of this study in order to be trained by the consultant and the research team in the use of the burn study instruments, the telemedicine equipment, and the Telemedicine Perceptions Questionnaire. The RA created an Excel spreadsheet to track all equipment by serial number.
DTIC
Clinical Medicine; Medical Services; Patients; Telemedicine

20040050722 Loyola Univ. Chicago, Maywood, IL
Mechanisms of a-Synuclein Aggregation and Toxicity
Wolozin, Benjamin; Sep. 2003; 90 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0781
Report No.(s): AD-A421019; No Copyright; Avail: CASI; A05, Hardcopy

ALPHA-Synuclein is a neurotoxic protein that aggregates to form pathological structures, termed Lewy bodies, in the brains of patients with Parkinson's disease. The aim of this proposal is to understand factors that stimulate or inhibit alpha-synuclein aggregation. In the second year of this proposal we investigated the sequence requirements for binding of iron to alpha-synuclein (Aim 1), the interaction of a-synuclein with different proteins and cofactors (Aim 2&3), and the mechanism of toxicity of alpha-synuclein (Aims 2 and 4). Our work has identified key research outcomes, including: 1) determining that the C-terminus of alpha-synuclein is crucial for metal binding; 2) identifying the proteasomal protein S6' as a protein that binds alpha-synuclein; 3) determining that beta-synuclein can prevent proteasomal inhibition by a-synuclein, probably due to inhibiting binding of a-synuclein to S6'; 4) determining that the E3 ubiquitin ligase, parkin, can prevent toxicity induced (alpha-synuclein in cell culture; 5) determining that alpha-synuclein induces phosphorylation of tau protein in vivo; and 6) comparing the vulnerability of C. Elegans over-expressing of alpha-synuclein to toxicity induced by metals, rotenone and paraquat, and determining that mutations in alpha-synuclein induce selective sensitivity to rotenone.
DTIC
Diseases; Toxicity

20040050724 Creighton Univ., Omaha, NE
Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel
Heaney, Robert P.; Oct. 2003; 10 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0818
Report No.(s): AD-A421022; No Copyright; Avail: CASI; A02, Hardcopy

The purposes of this study are to provide quantitative estimates of 1) the effective amount of vitamin D produced in the skin as a function of skin pigmentation; and 2) the rate of utilization of vitamin D as a function of ethnicity. The outcome will be estimates of the amount of vitamin D that must be given orally to military personnel of different races and in different assigned locations so as to ensure and maintain normal vitamin D status. In the first 15 months' work (the period covered by this report), we have accumulated about 50% of the targeted measurements for both objectives, in a racially diverse sample. No quantitative results will be available until all the measurements have been made and analyzed as a unit.
DTIC
Calciferol; Ethnic Factors; Exposure; Personnel

20040050725 Academy of Health Sciences (Army), Fort Sam Houston, TX
Neurosurgical Provider Proficiency: Clairification of Readiness and Management Implications
Dole, Mark J.; Apr. 2001; 97 pp.; In English
Report No.(s): AD-A421024; HCA-31-01; No Copyright; Avail: CASI; A05, Hardcopy

This research project used qualitative research methods to clarify the concept of surgical proficiency among U. S. Army neurosurgeons. The purpose is to assist effective management decisions and policies through a greater understanding of the complexities of defining, measuring, and influencing proficiency. The data collection included focused interviews with 23 military and civilian experts designed to clarify the concept of proficiency and semi-structured interviews with 9 of 19 active duty neurosurgeons to understand their perspective and concerns. The results found, with very high consistency, that the established proxies of credentialing, board certification, and accreditation are what an organization can and should consider at this time. Additionally, the interviewees expressed that the evaluation of physicians is, at its core, a local function best conducted by peers. In this regard the Army Medical Department has the proper structure and processes that encourage proficiency. Concerning the management of neurosurgeons, the results articulated the persistent dissatisfaction with pay, support staff, and assignments. The management of human resources, including retention and career management, is a critical obstacle in maintaining and improving proficiency in this specialty. This research strongly supports the neurosurgical consultant s recommendations submitted to the U.S. Army Surgeon General concerning consolidating assignments, encouraging resource sharing agreements with the Veteran s Affairs, and issues of morale. In addition, this research indicates that significant research and changes are necessary to align the Army s use of this specialty with the critical elements of surgical proficiency.
DTIC
Health; Management Planning

20040050726 Emory Univ., Atlanta, GA
Kainate Receptors in the Striatum: Implications for Excitotoxicity in Huntington's Disease
Smith, Yoland; Aug. 2003; 12 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9546
Report No.(s): AD-A421025; No Copyright; Avail: CASI; A03, Hardcopy

Huntington's disease (HD) is a neurodegenerative condition characterized by a loss of projection neurons in the striatum. Although various hypotheses have been proposed to explain the mechanisms that underlie the striatal neuronal death, excitotoxicity still deserves major interest. Recent findings indicate that changes in the genotype of the kainate receptor subunit, GluR6, are associated with variation in the age of onset of HE), which implicates the kalnate receptors in the pathogenesis of HD. The rationale of this project is that pre-synaptic kainate receptors control the release of glutamate from cortical or thalamic terminals, and that an abnormal regulation of these receptors is involved in the death of striatal neurons in HD. We, therefore, propose to use state-of-the-art electron microscope techniques to test a series of hypotheses that will help to elucidate the localization and understand better the role of kainate receptors in the primate striatum. The results of these studies will provide a strong basis for studying the potential mechanisms by which these receptors participate in the death of striatofugal neurons in HE). Moreover, they will help the development of novel therapeutic strategies aimed at targeting pre-synaptic kainate receptors in HE) and other basal ganglia disorders.
DTIC
Diseases; Receptors (Physiology); Striation

20040050727 Trudeau Inst., Inc., Saranac Lake, NY

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer

Dobrzanski, Mark J.; Sep. 2003; 16 pp.; In English

Contract(s)/Grant(s): DAMD17-01-1-0429

Report No.(s): AD-A421028; No Copyright; Avail: CASI; A03, Hardcopy

Cytolytic CD8 T cells fall into two subpopulations based on cytokine-secretion. Type 1 CD8 cells (Tcl) characteristically secrete IFN-7,whereas type 2 CDS cells (Tc2) secrete TL-4 and IL-5. Using an aggressive TSA mammary adenocarcinoma cell line, expression HA as a surrogate tumor- associated antigen, we assessed the relative therapeutic effects of adoptively transferred HA tumor antigen-specific Tcl and Tc2 CD8 effector cells in tumorbearing mice at different stages of malignancy. Tcl, but not Tc2, subpopulations effectively delayed tumor cell growth and mediated tumor regression in mice with early (Day 7) stages of established tumor development. However, neither therapy was effective in more advanced (Day 21) stages of malignancy. Flow cytometric analysis showed that donor Tcl cells accumulated at the tumor site and antitumor effects were highly tumor antigen specific. Titration studies of Tcl effector cells showed that protection and therapy were dose-dependent in vivo. Tcl effector cells derived from IFN-7-deficient mice were less therapeutically effective than that of corresponding wild-type mice suggesting hat effector cell-derived IFN-7 played a significant role in Tcl-subpopulations in adoptive immunotherapy for the treatment for the treatment of breast cancer.

DTIC

Antigens; Cancer; Cells (Biology); Control Equipment; Mammary Glands; Therapy; Titration; Tumors

20040050729 Foundation for Advanced Education in the Sciences, Inc., Bethesda, MD

The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer

Shillingford, Jonathan M.; Henninghausen,; Aug. 2003; 30 pp.; In English; Original contains color illustrations

Contract(s)/Grant(s): DAMD17-00-1-0246

Report No.(s): AD-A421032; No Copyright; Avail: CASI; A03, Hardcopy

The ongoing proposal is aimed at examining the role of the Jak-Stat pathway and its contribution to breast cancer development and progression. To this end, the proposal has further examined the localization of Stat3 and Stat5a in oncogenic mouse models and human breast cancer samples. These data have demonstrated that the nuclear accumulation of Stat3 and Stat5a is a common feature of tumor samples from both mouse and human origin. Furthermore, experiments have established that expression of the water transporter aquaporin 5 (AQP5) is prevalent in oncogenic mouse models although its expression is independent of tumor grade. Finally, it has %een demonstrated that the application of three defined protein markers has proved to be instrumental in the determination of stage- specific defects in mammary gland development. Although the generation of a Jak2 conditional knockout mouse model was unsuccessful, the data reported herein and in the literature strongly suggest a role for the Jak-Stat pathway in tumor development and/or progression.

DTIC

Cancer; Enzymes; Mammary Glands; Phosphorus; Tyrosine

20040050730 Academy of Health Sciences (Army), Fort Sam Houston, TX

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital

Echols, William T.; Jun. 20, 2001; 58 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421033; HCA-37-01; No Copyright; Avail: CASI; A04, Hardcopy

Computer simulation is an effective operational analysis tool gaining popularity in the health care field. Computer simulation is an objective, data driven decision support system that allows mangers to test solutions before implementation. A prospective computer simulation study was conducted at McDonald Army Community Hospital to aid in the possible consolidation of primary care operations. The primary goal of the study was to determine if the proposed floor plans could meet the access demands created by the consolidation of primary care operations and determine what is the most efficient combination of screening rooms, exam rooms and treatments rooms. Four models were developed using the MedModel computer simulation software. The models evaluated two possible floor plans and tested two processes of care that involved screening patients in separate screening rooms or in the exam rooms. A detailed analysis demonstrated that a combination of 5 screening rooms, 18 exam rooms, and 3 treatment rooms are sufficient to meet the demands of consolidated primary care operations and avoids a major construction project estimated near $300k. The analysis also demonstrated that the process of screening in exam rooms created a bottleneck and would require more than 20 exam rooms and additional staffing. The resources required to expand the floor plan beyond 20 exam rooms are financially prohibitive and not necessary. This study

determined that the consolidation of primary care operations is possible with minimal changes required to the current floor plan.
DTIC
Computerized Simulation; Health; Hospitals; Management Planning; Patients

20040050731 Florida Univ., Gainesville, FL
Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury
Hayes, Ronald L.; Oct. 2003; 7 pp.; In English
Contract(s)/Grant(s): DAMD17-99-1-9565
Report No.(s): AD-A421034; No Copyright; Avail: CASI; A02, Hardcopy

In addition to being the leading cause of death for civilians under 45 years of age, recent studies have confirmed that traumatic brain injury (TBI) is also one of the most frequent causes of morbidity and mortality on the modem battlefield. Specifically, 40% of battlefield fatalities in the Viet Nam war were due to head wounds and it has been reported that, patients arriving alive at military field hospitals, 20% with extremely severe brain wounds die before surgery was performed, and 80% received neurosurgical treatment, with a 10% surgical mortality rate. Nearly half of all single and/or multiple wound combat deaths result from injuries to the head, and these injuries are among the most frequent cause of morbidity and mortality on the battlefield. Penetrating head injury alone accounts for 25% of all wartime casualties and approximately 40% of these injuries are fatal.
DTIC
Brain; Brain Damage; Cells (Biology); Death; Injuries

20040050732 Maryland Univ., Baltimore, MD
Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase
Abdel-Aziz, Waleed; Milkas, Linda; Aug. 2003; 24 pp.; In English
Contract(s)/Grant(s): DAMD17-00-1-0324
Report No.(s): AD-A421036; No Copyright; Avail: CASI; A03, Hardcopy

We have previously isolated an intact, stable, and fully functional multiprotein DNA replication complex (designated the DNA synthesome) from a variety of non- malignant and malignant tumor cells and tissues including breast cancer cells. We have also shown that poly(ADP-ribose) polymerase (PARP) is among the components of the DNA synthesome. The transformation of a non-malignant human cell to a malignant stat is accompanied by a significant alteration in the mobility of specific components of the DNA synthesome, (such as PCNA) following 2D-PAOE analysis of the DNA synthesome, together with a 4-6-fold decrease in the replication fidelity of the replication complex. In order to establish whether the malignant transformation process is accompanied by an alteration in PARP, we purified PARP from malignant and non-malignant breast cells using phosphocellulose and hydroxylapatite chromatography. PARP was enriched during its purification from these cells. We have also found that PARP isolated from malignant breast cells exhibits a different migration pattem, when analyzed by 2D- PAGE, compared to the enzyme isolated from non-malignant breast cells; indicating that this enzyme may be modified in breast cancer cells. Mass spectrometric analyses and physical characteristics determination of PARP from malignant and non- malignant breast cells are underway in order to explain how PARP modification may contribute to the observed decrease in replication fidelity in breast cancer cells.
DTIC
Cancer; Cells (Biology); Mammary Glands; Neoplasms; Ribose; Tumors

20040050736 Evans Army Community Hospital, Fort Carson, CO
Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program
Schillaci, Jane F.; Apr. 20, 1999; 36 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421041; No Copyright; Avail: CASI; A03, Hardcopy

As the operational tempo of the armed services increases, all soldiers are expected to be in top physical condition to endure military operations and increase unit readiness. With women now making up 11 percent of the military, special issues, such as pregnancy, become significant to the health and readiness of the Armed Forces. Fort Carson's Mountain Post Wellness Center initiated a mandatory pregnancy physical training program, named 'Healthy Beginnings,' as an effort to help female soldiers maintain good physical condition during pregnancy and after delivery. This retrospective study evaluates 'Healthy Beginnings' to determine if frequent attendees of the program actually had healthier pregnancies, fewer complications, and a quicker recovery of aerobic and strength fitness than soldiers who attended less frequently. Using attendance rosters and

obstetric records, 111 soldiers were divided into two groups. Those who attended 'Healthy Beginnings' 50 percent of the time or more over the course of the soldier's pregnancy and in the 6 months allotted for post-partum recovery were compared to those who attended less than 50 percent of the time. Four variables were used in the comparison: gestation period, presence or absence of complications during pregnancy or delivery, weight gain, and a passing or failing grade on the Army Physical Fitness Test (APFT). The chi square test was used to analyze the variables of 'complications' and 'APFT results'; the student's t test was performed on the remaining variables. A significant difference ($p < 0.05$) between exercise groups was found only for the APFT variable, where frequent attendees of the program were significantly more likely than infrequent attendees to pass the APFT during the post-partum period. Recommendations are made to continue 'Healthy Beginnings' because of the social, psychological, and educational benefits it offers active-duty soldiers. (2 tables, 4 figures, 36 refs.)
DTIC
Education; Exercise Physiology; Females; Personnel; Physical Fitness; Physiological Effects; Pregnancy

20040050744 Mayo Clinic, Scottsdale, AZ
Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials
Gendler, Sandra J.; Sep. 2003; 117 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-01-1-0318
Report No.(s): AD-A421050; No Copyright; Avail: CASI; A06, Hardcopy

This project is focused on the development of novel tumor vaccines directed at MUC1 and other tumor antigens. Our specific aims are: 1) To assess the effectiveness of vaccine formulations against MUC1 and other tumor antigens in the prevention and treatment of spontaneous breast carcinomas in mice and 2) To translate the most effective vaccine strategies into phase I clinical trials in patients with high and low tumor burden. The model of spontaneous mammary cancer is the MUCl-expressing polyoma middle T antigen mice (MMT). We have tested four vaccines in the preclinical mouse model: 1) liposomal MUCl tandem repeat peptide, 2) dendritic cells (DCs) pulsed with tumor lysate, 3) DCs fused to MMT tumor cells, and 4) adoptive transfer of MUCl-specific cytotoxic T lymphocytes (CTLs). All vaccines elicited a strong immunological response, although CTLs in the tumor environment were tolerized. DCs pulsed with lysate accompanied by co-stimulation (4-lBB) greatly reduced tumor burden and reduced tolerance in MMT mice. Aim 2, to develop a clinical trial, is underway. The clinical trial protocol is under review. It is a phase I trial testing MUCl and HER-2/neu class I and class II peptides in breast cancer patients free of disease.
DTIC
Antigens; Cancer; Clinical Medicine; Mammary Glands

20040050745 Boston Medical Center Corp., Boston, MA
Analysis of AND-34, A Novel p130Cas-Binding GDP Exchange Factor Implicated in the Development of Tamoxifen Resistance in Human Breast Cancer
Lerner, Adam; Sep. 2003; 17 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0157
Report No.(s): AD-A421052; No Copyright; Avail: CASI; A03, Hardcopy

AND-34 is a murine protein that binds by a cdc25- like GDP exchange factor domain to the focal adhesion docking protein pl3OCas. Over-expression of either of the human homologues of AND-34 and pl30Cas, BCAR3 and BCAR1, respectively, have been reported to induce resistance to antiestrogens in breast cancer cell lines. In our work over the last two years, we have ascertained that over-expression of AND-34 leads to activation of the Rho family GRPases Cdc42 and Rac. We further have found that transfection of a constitutively active form of Rac induces antiestrogen resistance in breast cancer cell lines. Further, we find that BCAR3-mediated cyclin Dl up-regulation in breast cancer cell lines is dependent on both Rac and a Rac effector protein, PAKl. This work, which is described in an accompanying Cancer Research article that is in press for Oct. 15, 2003, suggests that one mechanism by which breast carcinoma could develop antiestrogen resistance is by up-regulation of Rac and PAKl- dependent signaling pathways. In further work over the past year, we find that both the SH2 domain and the GDP exchange factor-like domain of BCAR3 are required for antiestrogen resistance, as transfection of mutants lacking these domains fails to allow growth of ZR-75-l cells in the antiestrogen ICI 182,780. Finally, we have detected by Western analysis expression of BCAR3 in primary human breast carcinomas but not in normal mammoplasy specimens. Our efforts to detect BCAR3 by immunohistochemistry are ongoing.
DTIC
Cancer; Mammary Glands; Medical Science

20040050746 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

Characterization and Enhanced Processing of Soluble, Oligomeric GP140 Envelope Glycoproteins Derived from Human Immunodeficiency Virus Type-1 Primary Isolates

Jones-Trower, Agnes Y.; Jan. 2001; 179 pp.; In English

Report No.(s): AD-A421053; No Copyright; Avail: CASI; A09, Hardcopy

HIV-1 first interacts with host cells through its envelope glycoprotein (Env), the major target of neutralizing antibodies. The biologically relevant form of Env is an oligomer, both in its presentation to the immune system and in virus entry. Also, native Env is cleaved into its gp120 and gp41 non-covalently associated subunits. Env-based vaccines have thus far failed to efficiently generate broadly cross- reactive, neutralizing antibodies towards primary isolates. Possible explanations for their failure are either they were derived from laboratory-adapted strains or they have not preserved the conformational structures necessary to elicit broadly reactive responses. Producing a broadly effective Env- based vaccine is also potentially complicated by the existence of multiple HIV-1 genotypes. Here, I have constructed a panel of truncated env genes from primary isolates of several different HIV-1 clades. Recombinant vaccinia viruses expressing these genes produce a secreted Env known as gp140. These gp140s were characterized by sucrose density gradient centrifugation and size exclusion chromatography analyses to determine oligomeric status and degree of processing. While most processed gp140s dissociated to monomeric forms, there was evidence that certain isolates could retain gp120 in an oligomer. A large scale purification scheme was developed using lentil lectin affinity and size exclusion chromatographies to prepare gp140 oligomers. Pre- and post-production processing enhancers (furin and plasmin) were examined as means to bolster the amount of processed gp140, and reducible crosslinkers were employed to analyze the ability of processed gp140 to maintain oligomeric forms. The antigenic properties of the gp140s, both cleaved vs. uncleaved, and crosslinked vs. non-crosslinked, were analyzed by immunoprecipitation with a panel of well-characterized human and mouse antibodies.

DTIC

Human Immunodeficiency Virus; Proteins; Viruses

20040050747 Academy of Health Sciences (Army), Fort Sam Houston, TX

Measuring Cultural Change - A Management Focused Approach To Improving The Safety Culture

Weast, Brad; May 2002; 69 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421054; HCA-34-02; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this applied research project was to determine if implementing an eight step comprehensive patient safety program could positively impact staffs perception of safety culture. One 14-bed, surgical oncology intensive care unit was chosen as the focus of this effort. All eight steps of the program were completed on this unit. The first step was to obtain a baseline of staff s perception of safety culture using a ten-question survey tool. This was accomplished August 2001, n = 66. The survey tool was determined to be reliable, using the statistical package for the social sciences (SPSS), version 10.1, which measured the internal consistency of the tool (Chronbachs alpha = . 7907) for all ten survey questions when analyzing response data collected from outside the test unit, n = 329. Steps two, staff education on the sciences related to safety, three, identifying staff s safety concerns, four, event analysis, five, implementation of identified opportunities, six, documentation of results and seven, the sharing of results, were then administered. Step eight; re-surveying staff s perception of safety culture was completed February 2002, n = 64. Using SPSS, a one-way analysis of variance test was conducted to determine if there was statistical significance in the pair-wise difference between means from time one to time two. There was positive movement for all ten questions, with five identified as having statistical significance ($p < .05$). The results of this effort have been shared with the Organization s Performance Improvement, Patient Safety, Management and Board of Trustees Performance Improvement committees.

DTIC

Health; Management Planning; Safety

20040050750 Office of Naval Research, Arlington, VA

Science and Technology Transition Metrics

Kostoff, Ronald N.; Mar. 2004; 15 pp.; In English

Report No.(s): AD-A421058; No Copyright; Avail: CASI; A03, Hardcopy

On 27 October 1998, a workshop was convened by the National Institute for Occupational Safety and Health (NIOSH) to identify key metrics for NIOSH's Strategic Goals. The first NIOSH Strategic Goal (Conduct a targeted program of research to reduce morbidity, injuries, and mortality among workers in high-priority areas and high-risk sectors) was the major focus of the workshop. Its two related Objectives addressed 1) the success in implementing a research program based on its 1996 National Occupational Research Agenda (NORA) priorities (NORA is a framework to guide occupational safety and health

research into the next decade, and resulted in the establishment of a list of the top 21 research priorities) and 2) success in measuring its safety and health outcomes. The author was invited to participate as a member of the panel. This report generalizes a document that the author prepared for the NIOSH workshop, and was further refined during preparation for a DOE-sponsored workshop on S&T benefits, 4-5 March 2002. The paper focuses on key metrics for evaluating progress in a mission-oriented research program. The results and conclusions of the analyses are sufficiently generic for applicability to any science and technology (S&T) sponsoring organization.
DTIC
Health; Research and Development; Research Management; Technologies

20040050754 Wayne State Univ., Detroit, MI
Enhancing the Effectiveness of Breast Cancer Immunotherapy Through Manipulation of the T Cell Cytoskeleton
Ratner, Stuart; Sep. 2003; 12 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-01-1-0454
Report No.(s): AD-A421062; No Copyright; Avail: CASI; A03, Hardcopy

A limitation of adoptive immunotherapy is the poor survival and tumor localization of activated T cells after infusion. This problem arises in part from the polarized, adhesive form of activated T cells, which makes them prone to embolize in microvasculature. We hypothesized that transient inhibition of T cell polarization, induced just before infusion, will improve the survival and circulation of activated T cells. We found previously that T cells can be depolarized by the myosin light-chain kinase inhibitor ML-7. During the first project year we developed an ML-7 pretreatment protocol which depolarized activated T cells for 1 - 2 hr, then allowed them to recover normal cytotoxicity and proliferation within 24 hi. Initial experiments indicated that this protocol increased fourfold the homing of ErbB2-specific T cells to the ErbB2-expressing murine mammary tumor D2F2/E2. We have now confirmed this finding and tested whether the improved localization increased therapeutic effects. ML-7 pretreatment was found neither to enhance nor reduce the tumor- delaying effects of T cell infusion. This work is the first proof that cytoskeletal alteration of T cells can improve their trafficking behavior. Our first test, however, could not confirm that this strategy alone is enough to enhance adoptive immunotherapy.
DTIC
Cancer; Mammary Glands

20040050755 McMaster Univ., Hamilton, Ontario
Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer
Whelan, Timothy J.; Oct. 2003; 18 pp.; In English
Contract(s)/Grant(s): DAMD17-98-1-8100
Report No.(s): AD-A421063; No Copyright; Avail: CASI; A03, Hardcopy

Women with breast cancer have indicated their desire to be involved in decisions about their care. We have developed a decision aid, called the Decision Board for women regarding choices in breast cancer with respect to surgical treatment and the use of adjuvant chemotherapy. Randomized trials have demonstrated that the Decision Board not only increases patient knowledge, but improves patient satisfaction, decreases decisional conflict, and facilitates a shared decision-making between the oncologist and the patient. This present study builds on previous work and involves the development of different versions of the Decision Board using different types of media in order to improve the effectiveness of these instruments and to facilitate their wider use in the community. Two new versions have been produced: a computer- based version, which is presented on a laptop computer, and an easy-to-use paper-based version. These versions are currently being compared with a standard poster size foam-core version in a randomized trial. Important outcomes will include patient comprehension and acceptability. Newer versions of the Decision Board that are easier to use and present will lead to wider use in the community resulting in more knowledgeable and satisfied breast cancer patients.
DTIC
Cancer; Computer Techniques; Decision Support Systems; Mammary Glands; Medical Services

20040050757 Academy of Health Sciences (Army), Fort Sam Houston, TX
Pharmacy Utilization: A Study to Predict BAMC Outpatient Pharmacy Usage by Dual-Eligible Military Retiree/ Medicare-Eligible Beneficiaries Resulting From Implementation of the TRICARE Senior Pharmacy Program (TSRx)
Lankowicz, Andrew J.; Jun. 25, 2001; 59 pp.; In English
Report No.(s): AD-A421065; HCA-3-01; No Copyright; Avail: CASI; A04, Hardcopy

On April 1, 2001 a new outpatient pharmacy benefit called the TRICARE senior Pharmacy Program (TSRx) was extended

to all Medicare part B eligible age 65 and over non-TRICARE Senior Prime military healthcare system authorized beneficiaries. The problem that confronted Brooke Army Medical Center (BAMC) was the lack of knowledge about the effect that the TSRx program might have on utilization of the hospital s outpatient pharmacies. A survey (Appendix C) of these beneficiaries was conducted to predict the impact of the TSRx program. The survey revealed that these beneficiaries would reduce their usage of BAM coutpatient pharmacies by 12% to 13%. Eighty seven percent will continue to get their refill prescriptions and 88% their new prescriptions at BAMC. Usage of the mail order, TRICARE network retail, and TRICARE non- network retail pharmacies amounted to 4%, 8%, and 1% respectively for refill, and 0%, 11%, and 1% respectively for new fill prescriptions. Beneficiaries who decided to use one of the new pharmacy venues to get refill prescriptions are under utilizing the mail order option. Since this is the most cost effective new option for both the beneficiary and the government BAMC should develop a marketing program to encourage them to use the mail order option.
DTIC
Health; Management Planning; Pharmacology

20040050758 Utah Univ., Salt Lake City, UT
Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I
Viskochil, David H.; Oct. 2003; 156 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-99-1-9560
Report No.(s): AD-A421066; No Copyright; Avail: CASI; A08, Hardcopy

The goal of this research project was to identify molecular changes associated with the progression of peripheral nerve sheath tumors in neurofibromatosis type 1 (NF1). Archival and prospectively acquired plexiform neurofibromas and malignant peripheral nerve sheath tumors (MPNSTs) were collected and evaluated by immunohistochemical stains and genetic analyses. Tumor heterogeneity has been assessed by both methodologies. The level of ras signal transduction activity in frozen tumor specimens was estimated by ras-GTP/ ras-GDP ratios - A number of archival specimens in paraffin blocks have been evaluated, whereas a relatively small number of MPNSTs have been collected for complete analysis. Immunohistochemical stains have been developed to distinguish -high-grade versus low-grade MPNSTs and plexiform neurofibromas. The genome of plexiform neurofibromas is relatively stable, compared to the random genomic imbalances identified in low- and high-grade MPNSTs. There is minimal tumor heterogeneity in the plexiform neurofibromas, whereas there is increased tumor heterogeneity in MPNSTs. Ratios of ras-GTP to ras-GDP, in a subset of peripheral nerve sheath tumors, did not correlate well with level of malignancy.
DTIC
Diseases; Genetics; Nerves; Sheaths; Tumors

20040050759 California Univ., San Francisco, CA
Mammary Stromal Effects on Epithelial Differentiation and Expression of ESX and ErbB2 (HER2/neu)
Parmar, hema R.; Cunha, Gerald; Sep. 2003; 20 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-01-1-0189
Report No.(s): AD-A421067; No Copyright; Avail: CASI; A03, Hardcopy

A novel system for studying growth of normal human mammary epithelium in vivo as grafts in athymic nude mice has been developed. The key feature of this model is the reconstitution of the epithelial-stromal interactions required for normal growth and differentiation of the human mammary epithelium, which produces ducts that are comparable to the normal human mammary gland. Human breast epithelial organoids were combined with mammary fibroblasts from mouse or human origin in collagen gels, which were subsequently transplanted under the renal capsule of female nude mice hosts. The resulting grafts showed an increase in the ductal density than observed previously. These ducts expressed appropriate markers for luminal and myoepithelial cells and steroid receptors. This model allows for a variety of epithelial and stromal cells to be used in combination, which would aid in understanding key factors that regulate normal human mammary gland development. The manuscript detailing this data has been accepted for publication in the December 2002 issue of Endocrinology. The experiments currently in progress utilize both normal and tumor epithelium and carcinoma associated fibroblasts (CAF) in this model to assess the effect of CAF on the development of normal human mammary epithelium. CAF from a variety of tumors including ErbB2 positive tumors will be used.
DTIC
Cancer; Mammary Glands

20040050760 Parkinson's Inst., Sunnyvale, CA

Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease

Lee, Sueng-Jae; Dec. 2003; 27 pp.; In English; Original contains color illustrations

Contract(s)/Grant(s): DAMD17-02-1-0171

Report No.(s): AD-A421068; No Copyright; Avail: CASI; A03, Hardcopy

A growing body of evidence suggests that aggregation of alpha-syn might be the fundamental cause of many neurodegenerative diseases. Several groups have developed cell culture models to study the cytotoxic effect of alpha-synuclein, and some of them indeed have observed enhanced cell death when alpha-syn, especially its mutant forms, was overexpressed. However, the link between alpha-syn aggregation and cell death has not been clearly addressed in these model systems, nor are the molecular mechanisms underlying the toxicity known. We have begun to address these issues in a COS-7 cell model, and found that alpha-syn aggregation/oligomerization is tightly associated with Golgi fragmentation and cell death. The fragmentation of the GA has been also confirmed in a neuronal cell model, and the mode of Golgi fragmentation appears identical to that caused by microtubule-disrupting agents; dispersed Golgi fragments are localized to the transitional endoplasmic reticulum. These findings indicate that alpha-syn aggregation leads to impairment of microtubule-dependent intracellular trafficking, which in turn causes Golgi fragmentation.

DTIC

Cells (Biology); Diseases; Membranes; Mitochondria; Nervous System; Oligomers

20040050761 California Univ., Los Angeles, CA

Targeting Angiogenic Factors Contributing to Etiology and Progression of Human Ovarian Cancer

Pietras, Richard J.; Sep. 2003; 11 pp.; In English

Contract(s)/Grant(s): DAMD17-00-1-0558

Report No.(s): AD-A421071; No Copyright; Avail: CASI; A03, Hardcopy

The development of human ovarian cancer depends, in part,,on formation of an adequate blood supply. Tumor angiogenesis is essential for cancer growth, and vascular endothelial growth factor (VEGF) is critical in stimulating growth of vascular endothelial cells. VEGF is produced by ovarian cancers, and VEGF secretion is markedly higher in ovarian cancers with HER-2 oncogene overexpression. Herceptin, an antibody to HER-2 receptors, has direct antitumor effects, but the antibody also elicits profound reduction in VEGF secretion from ovarian cancer cells, and, thereby, halts tumor- associated angiogenesis. More complete suppression of angiogenesis may be elicited by treatments that synergistically suppress blood vessel proliferation, such as squalamine, an angiostatic steroid designated by the FDA as an orphan drug candidate for therapy of ovarian cancer.

DTIC

Cancer; Etiology

20040050762 Children's Hospital of Pittsburgh, Pittsburgh, PA

New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes

Trucco, Massimo; Nov. 2003; 463 pp.; In English; Original contains color illustrations

Contract(s)/Grant(s): DAMD17-01-1-0009

Report No.(s): AD-A421076; No Copyright; Avail: CASI; A20, Hardcopy

Type 1 diabetes is considered an auto immune disease characterized by the presence of inflammatory cells in the islets of Langerhas. These cells are T lymphocytes, considered responsible for the destruction of the insulin producing beta-cells present in the islets. When the majority of the beta cells are dead, the disease presents, frequently with an abrupt and clinically serious onset. Individuals are considered at high risk to develop the disease, based on their genetic susceptibility (as determined by the presence of susceptibility alleles at various HLA loci) and on the presence in serum of autoantibodies directed against islet specific autoantigens (e.g., GAD65, IA-2, and insulin). The aim of this program is to determine whom among the Army personnel is at high risk to develop the disease in order to prevent the unexpected onset of the disease that may be associated with tragic consequences, and to initiate an educational program aimed at reducing practical and psychological hurdles. Furthermore, different individuals develop disease complications (i.e., retinopathy, nephropathy, neuropathy) at different timepoints after the onset. The susceptibility to complications could also be genetic. The human genome will be scanned systematically to characterize these susceptibility genes. Proteomic analysis will be performed in tandem to confirm the genetic associations.

DTIC

Antibodies; Lymphocytes; Metabolic Diseases; Prevention

20040050766 TRICARE Management Activity, Falls Church, VA

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities

Kovats, Kenneth R., Jr; Apr. 29, 2002; 47 pp.; In English

Report No.(s): AD-A421087; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study is to describe outcome measures of patients who are 65 years of age and older admitted to military treatment facilities (MTFs). The Military Health System (MHS) faces a continuing growth of aging beneficiaries who will consume a disproportionate share of health care resources. The TRICARE for Life program and other proposals are attempting to provide quality care for this population. Some of these aging beneficiaries continue to seek care in the MTFs, and this population provides valuable experience for the MTF graduate medical education and training programs. This study describes three organizationally focused outcome measurements for this population: mortality rate, length of stay, and readmission rate for the three most prevalent Medicare Diagnostic Related Groups (DRGs). Admission information was obtained from the MHS Standard Inpatient Data Repository for patients age 65 and older who were admitted to the MTF for DRGs 88 (chronic obstructive pulmonary disease), 89 (simple pneumonia with complications and/or comorbidities), and 127 (congestive heart failure) during fiscal year 2001. Of the 49 MTFs reviewed, over 87% are performing at or below Medicare averages for lengths of stay and mortality. Facilities exceeding Medicare averages tend to have lower numbers of dispositions for that DRG. (6 tables, 13 figures, 46 refs.)

DTIC

Aging (Biology); Defense Program; Health; Medical Services; Patients; Physiology; Total Quality Management

20040050768 Army Southeastern Regional Medical Command, Fort Gordon, GA

Phase II-SOF Knowledge Coupler-Based Phase I XML Schema

Whitlock, Warren L.; Jun. 2003; 7 pp.; In English

Contract(s)/Grant(s): MIPR-3GD3E93093

Report No.(s): AD-A421091; No Copyright; Avail: CASI; A02, Hardcopy

To analyze the Special Operations Forces Medical Handbook (SOFMH) content an initial text parser was built that placed text into a structured database using text source files. This database provided the original information to display to SOF medics or editors using the application. Several robust database applications were created to allow manipulation and display of medical knowledge over the complete SRMH content A web-enabled application is being completed to allow online updating and virtual collaboration of geographically separated authors and subject matter experts to meet the author and editorial review board requirements. This application is necessary to allow authors to build associations necessary to the formulation of the relationships integral to the relationships in the database. Author and subject matter expert input is required to maintain the suitability of the suggested treatment to the capabilities of the SOF medic over subsequent versions of the knowledge engine application. An image database was created to manage the 700+ images included in the CD-ROM version of the SOFMH. This database includes assignments of the College of American Pathologists' Systematized Nomenclature of Medicine -Clinical Terms (SNOMED- CT) codes to particular images. These images are contained in an online catalog as well as appearing on their original SOFMH CD-ROM topic page. The SNOMED-CT codes are used to establish relationships with topic content per the author/subject matter expert's recommendations.

DTIC

Clinical Medicine; Couplers; Data Bases; Knowledge Based Systems

20040050769 California Univ., Berkeley, CA

Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion

Bertozzi, Carolyn R.; Sep. 2001; 5 pp.; In English

Contract(s)/Grant(s): N00014-98-1-0605

Report No.(s): AD-A421093; No Copyright; Avail: CASI; A01, Hardcopy

The objective is to develop techniques for cell surface modification in order to interface cells with synthetic materials in the context of cell-based biosensors. Our approach uses the cell's metabolic machinery for oligosaccharide biosynthesis to deliver novel chemically reactive functional groups to the cell surface. We developed methods for cell adhesion using ketone-hydrazone condensation reactions and a new reaction we developed called the Staudinger ligation. We identified new metabolic pathways for delivery of reactive functional groups to cell surfaces. These tools were used to attach cells to synthetic surfaces in a robust manner with high resistance to shear stress.

DTIC

Adhesion; Biosynthesis; Cells (Biology); Metabolism; Reactivity

20040050773 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

Adherence to Hypercholesterolemia Management Guidelines by Health Care Providers in a USA Air Force Medical Treatment Facility

Chen, Jen-Jen H.; May 2001; 74 pp.; In English

Report No.(s): AD-A421097; No Copyright; Avail: CASI; A04, Hardcopy

Building a healthy community is the goal of Healthy People 2000 and Healthy People 2010, and is also one of the U.S. Air Force Medical Service priorities. Periodic cholesterol screening and lifestyle modification can prevent the suffering from coronary heart disease, save lives, minimize financial burden, and effectively utilize the limited resources. The purpose of this study was to describe the adherence to the National Cholesterol Education Program (NCEP) guidelines pertaining to cholesterol screening and the use of lifestyle modification management for treating high cholesterol in adults without evidence of coronary heart disease by health care providers in a USA Air Force medical treatment facility. The researcher conducted a retrospective medical record review using a checklist to describe health care providers adherence to the NCEP guidelines on cholesterol screening in adults without evidence of coronary heart disease. And the checklist was developed by following the NCEP cholesterol management algorithm. A pilot study was conducted and intra-rater reliability of 0.9 was determined. A total of 100 records meeting inclusion criteria were reviewed. Results showed that the cholesterol screening rate was 75% and the compliance rate of providing lifestyle modification counseling to clients with elevated cholesterol level was 58% to 64% which were higher than the findings of other studies. There were 23 current smokers, and 18 of them received smoking cessation counseling which was also higher than the findings of other studies. However, the rate of providing follow-up instruction was poor, only 18% of clients received specific follow-up instruction.

DTIC

Health; Medical Services; United States

20040050775 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners

Newman, Sara B.; Jan. 2002; 180 pp.; In English

Report No.(s): AD-A421099; No Copyright; Avail: CASI; A09, Hardcopy

Infections caused by Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (GC) are the most commonly reported bacterial sexually transmitted infections in the U.S. No studies have been conducted to determine the prevalence of these two infections in women federal prisoners. Information about the prevalence of and risk factors for the infections may assist the Federal Bureau of Prisons to implement a rational screening approach for CT and GC in female inmates. Two study phases were implemented as part of this protocol. The first study phase relied on qualitative techniques: focus groups and group-based cognitive interviews were implemented to assist in the design of the study instrument and study procedures to be used in the second phase of the study. For the second, quantitative phase, urine specimens and self- collected swabs were taken from 983 women incarcerated in two federal prison facilities in the U.S. Participants completed a self-administered questionnaire on socio-demographic characteristics, and sexual and clinical history. Another questionnaire was administered to participants after specimen collection on preferences for self-collected swab, urine collection and pelvic examination. Specimens were analyzed at the Johns Hopkins University Chlamydia laboratory using strand displacement amplification technology to detect the presence of CT and/or GC DNA. Prevalence of CT and GC was calculated for each of the prison sites. Potential risk markers associated with infection were assessed. Participants preferences of self-collected swab and urine were also compared between the two sites. CT infection was found in 1.3% of the participants at one site where women are screened when they enter the prison, and in 2.3% at the other site, where women are not screened.

DTIC

Diseases; Epidemiology; Females; Infectious Diseases; Microorganisms

20040050777 William Beaumont Army Hospital, El Paso, TX

Cost Benefit Analysis of Providing Level II Trauma Care at William Beaumont Army Medical Center (WBAMC)

Gerepka, Peter; Aug. 2002; 73 pp.; In English

Report No.(s): AD-A421102; AMDCS-1-02; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this retrospective study is to provide financial analysis of the costs associated with providing Level II trauma care to patients at William Beaumont Army Medical Center (WBAMC). Special focus is directed at civilian emergencies and their ability to pay for services. During the period from 1 October 2000 to 30 September 2001, WBAMC, a designated Level II trauma center by the American College of Surgeons, provided care for 410 patients of which 181 were civilian emergencies. The civilian emergency patients were billed $2,478, 729.77 of which $416,361.82 was collected for a

loss of $2,062,367.21. Only 31 civilian trauma patients made payments towards the care provided. The civilian trauma patients required 486 bed days in the ICU and 643 days on the surgical ward for a total hospital stay of 1,129 days. The Length of Stay (LOS) for civilian trauma patients increased 75% (3.56 to 6.24 days) from fiscal year 1998 (before Level II certification) to fiscal year 2001. The Personnel costs associated with Level II trauma were $1,444,790. Outpatient costs were $47,245. Reimbursements, staff costs, and outpatient costs represent the significant costs of Level II trauma. The cost of providing Level II trauma at William Beaumont Army Medical Center during Fiscal Year 2001(FY01) was $3,554,402.
DTIC
Cost Analysis; Cost Effectiveness; Emergencies

20040050778 Naval Health Research Center, San Diego, CA
Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements
Galarneau, Michael R.; Konoske, Paula; Tropeano, Anne; Pang, Gerald; Jan. 2002; 65 pp.; In English
Report No.(s): AD-A421103; NHRC-02-24; No Copyright; Avail: CASI; A04, Hardcopy

This report is organized into six sections. Section 1, introduction; Section 2, an overview of the medical evacuation system; Section 3 references relevant doctrinal guidance used to focus the development of En Route Care System. The development of the methodology, patient treatment profiles, and medications, supplies and equipment requirements are detailed in Section 3. Section 4 reviews the SMEs' recommendations for ERCS personnel; Sections 5 and 6 present some issues and conclusions related to en route care. Current Marine Corps warfighting concepts anticipate an increasingly hostile and uncertain battlefield that will be defended by highly mobile and dispersed combat forces. Such an environment requires a reduced medical presence that responds quickly without compromising the standard of care. To achieve these goals, the Marine Corps must rely more heavily on medical evacuation and en route care, the process of providing essential medical care while transporting critically injured and ill casualties. The Marine Corps has launched an effort to develop the ERCS. Naval Health Research Center and Marine Corps Combat Development Center sponsored a conference to (1) identify the equipment and consumable supplies required to provide en route care during tactical medical evacuation, and (2) determine the skills and personnel required to provide en route care. The objectives of this paper are to provide a comprehensive understanding of the need for en route care, detail the pertinent factors shaping ERCS, and document the development of ERCS medical resource requirements. Included in this paper is a description of the en route care conference, which helped to define the clinical capability needed to provide en route care of critically injured and ill casualties during tactical evacuation.
DTIC
Medical Services; Patients; Routes; Systems Engineering

20040050779 Naval Health Research Center, San Diego, CA
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample
Booth-Kewley, Stephanie; Andrews, Allyson M.; Shaffer, Richard A.; Gilman, Patricia; Minagawa, Rahn Y.; Jan. 2000; 11 pp.; In English
Contract(s)/Grant(s): DAMD17-98-2-8007
Report No.(s): AD-A421106; NHRC-00-12; No Copyright; Avail: CASI; A03, Hardcopy

Although a substantial number of studies have been conducted to evaluated the impact of various human immunodeficiency virus (HIV) prevention programs, most of them have focused on civilian populations. There is a clear need to develop and evaluated sexually transmitted diseases (STD)/HIV prevention programs designed specifically for U.S. military populations. The object of the present study was to determine whether a behavioral intervention known as the STD/HIV Intervention Program (SHIP) would have a sustained positive impact on the behavior of a sample of Marines. A 1-year follow-up telephone interview was administered to (1) Marines who participated in the SHIP course (intervention group), (2) a quasi-control group of Marines who were not exposed to SHIP course. The intervention and control groups differed significantly in the percentage of the time they had used condoms during the past year. The intervention participants reported using condoms a greater percentage of the time than the non-participants.
DTIC
Diseases; Human Immunodeficiency Virus; Personnel

20040050781 Georgetown Univ., Washington, DC
Targeting of Oncogenic Proteins for Intracellular Degradation
Byers, Stephen W.; Jul. 2002; 95 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-98-1-8089
Report No.(s): AD-A421110; No Copyright; Avail: CASI; A05, Hardcopy

Beta-catanin, is an important component of the wnt signaling pathway and IkBalpha is an important regulator of the NF-KB pathway. Both proteins are phosphorylated at serines in the N- terminal region, which subseouently target them for ubiquitination by the same ubiquitin ligase complex. In the first year of the award, we demonstrated proof of principle that small peptides could be constructed that would enter cells and target oncogenic proteins, such as beta-catenin and erbB2 for intracellular degradation. During the course of this work, we discovered that he similarities in the regulation of beta-catenin and IkBalpha ubiquitination extended to the kinases that are involved in control of their phosphorylation. The IKK complex is responsible for the phosphorylation of IkBalpha while GSK-3beta is thought to regulate beta-catenin phosyphorylation. This work showed for the first time that IKK also exists in a complex with beta-catenin and that expression of either IKKalpha or IKKbeta can decrease beta-catenin signaling. Consistent with this, we found that cytokines, such as TNFalpha also markedly regulated beta-catenin activity. Our demonstration that cytokine and beta-catenin signaling are cross-regulated at the level of targeted protein degradation is important and points to a clinically significant relationship between inflammatory responses and oncogenic activity.
DTIC
Cancer; Carcinogens; Degradation; Enzymes; Mammary Glands; Peptides; Phosphorus; Proteins; Tumors; Viruses

20040050783 Naval Health Research Center, San Diego, CA
Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits
Stander, Valerie A.; Olson, Cheryl B.; Merrill, Lex L.; Jan. 2000; 11 pp.; In English
Report No.(s): AD-A421111; NHRC-00-25; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of the present research was to identify how specific characteristics of childhood sexual experiences might relate to self-identification as a victim of sexual abuse. In particular, this study explored the role that self-definitions might play in explaining differential rates of self-reported childhood sexual abuse between men and women. Hierarchical logistic regression analyses were performed to estimate the unique contribution of demographic as well as childhood sexual experience (CSE) characteristics in accounting for variability in the likelihood that participants defined themselves as victims of childhood abuse. Approximately 39% of those who reported CSEs prior to age 14 with someone at least five years older than themselves believed those CSEs were abusive. Proportionally more women than men were self-defined victims (50% versus 14%). Recruits who were older at the time of the survey, who were White, whose parents had not married, and who had a lower family income were more likely to define themselves as abused. Abuse characteristics most strongly associated with self-defined sexual abuse were the use of threats or force, incest, and younger age at the time of the experience. An analysis of within-family abuse also suggested that men were more likely to define themselves as abuse victims if the perpetrator was also male.
DTIC
Navy; Violence

20040050784 Naval Health Research Center, San Diego, CA
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning
Merrill, Lex L.; Gulmond, Jennifer M.; Thomsen, Cynthia J.; Milner, Joel S.; Jan. 2002; 12 pp.; In English
Contract(s)/Grant(s): Proj-PEBUPERS
Report No.(s): AD-A421112; NHRC-02-25; No Copyright; Avail: CASI; A03, Hardcopy

Theory and research suggest that childhood sexual abuse (CSA) may lead to either avoidance of sex or compulsive sexual behavior. We proposed and tested a model that specified different pathways through which these divergent outcomes may occur. CSA victims who used avoidant strategies to cope with abuse were expected to display higher levels of sexual problems and to have fewer sex partners as adults. In contrast, CSA victims who used self-destructive strategies to cope with abuse were expected to display more dysfunctional sexual behavior and to report a higher number of sex partners as adults. Predictions were tested using data from a sample of female U.S. Navy recruits who reported CSA experiences (N = 547). As expected, the results indicated that the effects of CSA on number of sex partners were largely mediated by coping strategy and dysfunctional sexual behavior.
DTIC
Children; Violence

20040050785 Naval Health Research Center, San Diego, CA

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms

Galarneau, Michael R.; Pang, Gerald; Konoske, Paula J.; Jan. 2001; 77 pp.; In English

Contract(s)/Grant(s): Proj-PE63706N

Report No.(s): AD-A421113; NHRC-01-18; No Copyright; Avail: CASI; A05, Hardcopy

To maintain force readiness, the Navy understands the need to keep pace with advances in medicine. This process should be conducted within an environment of focused medical logistics emphasizing responsiveness, flexibility, precision, and visibility. This can be accomplished by examining the clinical operations of shipboard medicine, identifying relationships between patient condition (PC) types, providers, clinical tasks, and medical supplies and then mapping the relationships to form a structure that describes the application of care aboard ship. The primary objective was the development of a medical supply knowledge base that includes details about the clinical relationships occurring in ships' medical departments. The purpose of the knowledge base was to extract the interactions between individual pieces of medical materiel and patient care to provide the Fleet visibility to track and monitor the effects of proposed changes in the Authorized Minimal Medical Allowance Lists (AMMALs). Two General Medical Officer (GMO) supply sets, the GMO sick-bay supplemental AMMAL 7016 and the GMO level-2 laboratory supplemental AMMAL 7019 were examined. Thirty-three clinicians developed GMO-level treatment profiles for 337 PCs known to occur aboard ship. Each profile was broken down into its individual treatment tasks. The medical gear to conduct the tasks was then identified and assigned. Once the supplies had been assigned to the tasks, they were separated into a revised GMO AMMAL 7016 and a revised GMO AMMAL 7019. The results showed that clinical care aboard OMO AMMAL platforms could be improved while using less materiel. Reductions were realized in weight, cube, and cost. Excluding the reductions in equipment, savings in consumable item costs totaled $471,667. 12 across the Fleet. Because consumable supplies are routinely reordered, the savings would continue to accrue over time.

DTIC

Emergencies; Health; Medical Equipment; Medical Services; Supplying

20040050786 Naval Health Research Center, San Diego, CA

Research on Child Abuse in the US Armed Forces

Chamberlain, Heather; Stander, Valerie; Merrill, Lex L.; Jan. 2001; 12 pp.; In English

Report No.(s): AD-A421114; NHRC-01-16; No Copyright; Avail: CASI; A03, Hardcopy

Child maltreatment in the USA has provoked considerable interest in recent years. Child abuse and neglect are prevalent in all parts of American society. Although children of military personnel experience maltreatment, little research has been completed which compares child abuse rates in the military with those for civilian populations. Studies that have assessed child abuse in the armed forces have been based on official reports recorded in military Family Advocacy central registries. Because a standardized method for recording child abuse does not exist, conclusions regarding the prevalence of abuse are often inaccurate. We explore this and other methodological constraints such as differences in definitions, data collection procedures, and utilization of records, which make estimating child abuse accurately in both military and civilian populations difficult. A review of the literature on child maltreatment in the services also reveals that there are many correlates of child abuse unique to the military family. Finally, we discuss both the risk and protective factors within military life that may influence the occurrence of child maltreatment.

DTIC

Armed Forces; Children; Violence

20040050787 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination

Barnes, Roberta J.; May 2000; 77 pp.; In English

Report No.(s): AD-A421115; No Copyright; Avail: CASI; A05, Hardcopy

Testicular cancer is the most common neoplasm found in men between the ages of 15 and 35, with an incidence that has nearly doubled over the last 20 years. Previous studies in the USA and Europe suggests that there is a limited awareness of testicular cancer and an even more limited practice of testicular self-examination. The purpose of this research was to investigate the beliefs and practices of active duty Air Force males related to testicular cancer and testicular self-examination. This study used a descriptive design to examine concepts from the health belief model and social cognitive theory that have been predictive of self-care and prevention behaviors. A nonrandom convenience sample of 100 men was taken from the active duty Air Force population assigned to a large Air Force facility in the eastern section of the USA. Data were collected using a questionnaire adapted from Champion's tool measuring variables related to breast self-examination. The findings of this

study revealed that an overwhelming number of men had never practiced testicular self-examination. The vast majority of participants also indicated that no specific barriers existed to impede its practice.
DTIC
Armed Forces (United States); Cancer; Males; Personnel; Procedures

20040050788 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers
Elizabeth Margaret, Maloney; Jan. 2002; 133 pp.; In English
Report No.(s): AD-A421116; No Copyright; Avail: CASI; A07, Hardcopy

Human T-lymphotropic virus type I (HTLV-I) infection is associated with infective dermatitis of childhood. Early childhood infection is also thought to play a role in development of a rare malignancy associated with HTLV-I, adult T-cell leukemia/lymphoma (ATL). ATL develops in <5.0% of persons infected with HTLV-I in childhood. Identifying markers associated with increased risk of ATL among infected persons could be used to target persons for early clinical intervention. Several case reports have documented ATL patients with childhood histories of infective dermatitis. Infective dermatitis may be a cutaneous marker of risk for ATL. There may be additional health effects of HTLV-I infection in children that could be potential markers of risk for development of ATL, however this age group has not been well studied. A cohort study of 28 HTLV-I infected and 280 uninfected children born to women who attended one of two antenatal clinics in Kingston, Jamaica between January 1989 and August 1990 were enrolled in this study. Children received physical examinations and phlebotomy at clinic visits scheduled from six weeks to ten years of age. The primary analysis compared incidence rates for targeted health outcomes between HTLV-I infected and uninfected children. Based on the results of the primary analysis, the secondary analysis examined associations of HTLV-I-associated health outcomes with pre-diagnostic levels of viral and immunologic markers, as well as host genetic markers among HTLV-I infected children. Additionally, levels of immunologic markers at the time of diagnosis were described in infected children with a specific health outcome. HTLV-I infected children had significantly increased incidence rates of seborrheic dermatitis, eczema and hyperreflexia of the lower limbs compared to HTLV-I uninfected children. Additionally, compared to uninfected childrethe time of diagnosis, infected children with seborrheic dermatiti
DTIC
Children; Clinical Medicine; Diagnosis; Diseases; Genetics; Health; Immunology; Infectious Diseases; Lymphocytes; Markers; Viruses

20040050789 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War
Houlihan, Sandra; May 2000; 121 pp.; In English
Report No.(s): AD-A421118; No Copyright; Avail: CASI; A06, Hardcopy

World events and defense requirements have forced the military paradigm to shift. The inevitable result is that the Family Nurse Practitioner (FNP) will take on a more active role in the deployed setting, especially in missions involving civilians with primary care needs as seen in Military Operations Other Than War (MOOTW). What is the perception of the FNP of their role in these missions? What is the perception of the Family Physician (FP) of the FNP role in these missions? Because of the collaborative role the FNP will have with the family physician it is important to compare these perceptions to assure quality collaborative care. Biddles Role theory will be the framework used using a questionnaire as a strategy for studying behavior roles. The purpose of this study will be to describe and compare the perceptions of the two provider groups and examine the differences and similarities for statistical significance. A 65-item survey utilizing a 5 point Likert-type scale in which the FNPs and FPs are requested to rate their perceptions of the ability of the FNP to treat a variety of patients will be used. The survey population will consist of all CONUS active duty Air Force FNPs practicing in the role of FNP, and CONUS active duty Air Force FPs currently or previously working with, an AF FNP. Data will be analyzed using descriptive and inferential statistics. SPSS will be used to analyze the quantitative data provided by the FNP/FP responses. Responses to open-ended questions will be analyzed through a content analysis. This analysis will determine if there are differences between the FP and FNP and provide insight on the perceived training needed to prepare the FNP for the deployment role.
DTIC
Medical Personnel; Military Operations; Physicians; Warfare

20040050794 Mount Sinai School of Medicine, New York, NY

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility

Rosenstein, Barry S.; Jul. 2003; 7 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0502

Report No.(s): AD-A421128; No Copyright; Avail: CASI; A02, Hardcopy

The hypothesis being tested in this project is that a greater proportion of African-Americans with breast cancer harbor germline mutation in the ATM gene compared to African-American women without breast cancer. An additional objective is to determine the functional impact upon the protein encoded by the ATM gene for each mutation identified. Specific Aims: The specific aims of this project are to (1) screen 100 African-American breast cancer patients and 100 African-American women without breast cancer and (2) perform functional studies using cells from patients identified as ATM carriers to determine whether each ATM mutation identified affect radiosensitivity and levels of the protein encoded by the ATM gene for each mutation identified. The main accomplishment during the first year of this study was to establish and optimize all of the assays and technique that will be used in this project.

DTIC

Africa; Cancer; Mammary Glands; Mutations; Populations

20040050796 Fox Chase Cancer Center, Philadelphia, PA

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer

Diefenbach, Michael A.; Nov. 2003; 7 pp.; In English

Contract(s)/Grant(s): DAMD17-01-1-0006

Report No.(s): AD-A421130; No Copyright; Avail: CASI; A02, Hardcopy

The study evaluates an intervention designed to facilitate treatment decision making, adjustment, and coping among early-stage prostate cancer patients and their spouse/partners, in a randomized controlled trial. The intervention is based on the Cognitive-Social Health Information Processing (C-SHIP) framework that postulates that decision making is determined by cognitive factors (i.e., perceptions about vulnerability; expectancies and beliefs; values and goals), affective factors (i.e., concerns and worry about the disease and its treatment), as well as self- regulatory skills (i.e., the ability to manage distress and effectively execute recommended behaviors) . To date, we have 300 couples enrolled in the study; 6 month follow-up questionnaires have been sent to 232 couples with 205 patients (88%) and 160 (69%) spouses/partners completed; 12-month follow-up questionnaires have been sent to 182 patients and 160 spouse/ partners who remain in the study. We now have a total of 166 patients (91% return) and 150 spouse/partners (94% return) who have completed all of the required assessment for the study. Preliminary data analyses point to the acceptability and efficacy of the Cognitive and Affective Reactions and Expectations (CARE) intervention compared to General Health Intervention (GHI), not only in the short-term but also in the long-term at 6-months post baseline.

DTIC

Cancer; Decision Making; Human Beings; Males; Prostate Gland

20040050797 Pittsburgh Univ., Pittsburgh, PA

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage

Koty, Patrick P.; Sep. 2003; 6 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0683

Report No.(s): AD-A421131; No Copyright; Avail: CASI; A02, Hardcopy

Although great strides have been made in breast cancer screening and treatment, it remains the second highest cause of cancer- related deaths for women in the USA. Current prevention focuses on oral administration%of tamoxifen which decreases breast cancer incidence but increases the risk for secondary uterine cancer. In addition, tamoxifen may not be effective in preventing those lesions that are estrogen receptor (ER) negative based on its primary function of suppressing cell proliferation by blocking the estrogen receptor. We hypothesize that programmed cell death is dysregulated in premalignant and malignant breast cells which permits both ER-positive and ER-negative cells to avoid cell death. We intend to investigate whether treating premalignant breast cells with a molecular genetic-based agent may be effective alone or in concert with tamoxifen treatment to induce cell death in both ER-positive and ER-negative cells. Ultimately, we envision delivering genetic-based preventive agents and/or tamoxifen directly to the breast ductal lobe of these high risk individuals thus eliminating any potential for tamoxifen-induced uterine cancers.

DTIC

Apoptosis; Cancer; Chemotherapy; Health; Mammary Glands; Prevention

20040050798 Illinois Univ., Chicago, IL

Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer

Onyuksel, Hayat; Sep. 2003; 23 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0415

Report No.(s): AD-A421132; No Copyright; Avail: CASI; A03, Hardcopy

Receptors for vasoactive intestinal peptide (VIP- R) are overexpressed in human breast cancer. This phenomenon may have important diagnostic and therapeutic implications because carrier systems such as sterically stabilized liposomes (SSL) loaded with imaging or therapeutic agents, and with surface ligands specific to VIP-R could potentially be actively targeted to breast cancer. This part of the project aims to test the targeting ability of VIP-SSL to n-methyl nitrosourea (MNU)-induced rat breast cancer in vitro. First, VIP was conjugated to an activated DSPE-PEG (DSPE-PEG-NHS) under mild conditions to obtain a predominantly 1:1 conjugate of VIP and DSPE-PEG (DSPE-PEG-VIP), as evidenced by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE). To test breast cancer targeting ability in vitro, DSPE-PEG-VIP was inserted into preformed fluorescent cholesterol (BODIPY- Chol) labeled SSL by incubation at 37 deg C. These VIP-SSL were incubated with MNU-induced rat breast cancer tissue sections. The results showed that when compared to fluorescent SSL without VIP or non-covalently attached VIP, significantly more VIP-SSL were attached to rat breast cancer tissues indicating that SSL with covalently attached VIP can be actively targeted to rat breast cancer tissues. This targeted carrier system is currently being explored for functional imaging of breast cancer.

DTIC

Cancer; Imaging Techniques; Lipids; Mammary Glands; Peptides

20040050800 Academy of Health Sciences (Army), Fort Sam Houston, TX

A Case Study of Job Satisfaction in Surgical Services at Martin Army Community Hospital

Lutter, Gregory A.; Apr. 2003; 64 pp.; In English

Report No.(s): AD-A421134; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this case study was to understand, assess, describe, and improve job satisfaction among providers of patient care in surgical services at Martin Army Community Hospital (MACH), Fort Benning, Georgia. The case study employed the nominal group technique to garner job factors specific to the professionals involved in surgical services at MACH. Job satisfaction was structured under the framework of Herzberg s two-factor theory. Operating room time, equality, and professional development emerged as the factors most closely associated with dissatisfaction. Geographic location, challenging work, and patient care were most closely associated with satisfaction. The analytic findings resulted in support for the recommendation to obtain funding for additional nursing staff through a venture capital initiative. This solution incorporated major job factors identified through the research as well as the organizational resource constraints facing the organization.

DTIC

Hospitals; Medical Services; Tasks

20040050801 Mount Sinai School of Medicine, New York, NY

ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer

Rosenstein, Barry S.; Jul. 2003; 7 pp.; In English

Contract(s)/Grant(s): DAMD17-02-1-0503

Report No.(s): AD-A421135; No Copyright; Avail: CASI; A02, Hardcopy

The hypothesis being tested in this project is that a greater proportion of patients who develop radiation- induced RTOG/EORTC grade 3/4 subcutaneous late tissue morbidity possess a mutated ATM gene compared with patients who do not suffer these complications. An additional objective is to determine the functional impact upon the protein encoded both in the ATM gene for each mutation identified and subsequent cellular radiosensitivity, The specific aims of this project are to (1) screen 50 breast cancer patients for a ATM mutations who developed radiation-induced grade 3/4 late subcutaneous tissue morbidity as defined by the RTOG/EORTC scoring scheme, (2) establish control group and screen 100 patients without evidence of this late radiation reaction, and (3) perform functional studies using cells from patients identified as ATM carriers to determine to what extent each ATM mutation identified affect radiosensitivity and normal activity of the protein produced by the ATM gene.

DTIC

Cancer; Mammary Glands; Mutations; Radiation Therapy

20040050802 Calgary Univ., Alberta
Activation of ATM by DNA Damaging Agents
Kurz, Ebba U.; Lees-Miller, Susan P.; Sep. 2003; 9 pp.; In English
Contract(s)/Grant(s): DAMD17-02-1-0318
Report No.(s): AD-A421136; No Copyright; Avail: CASI; A02, Hardcopy

Ataxia-telangiectasia mutated (ATM) is a protein kinase that acts as a master switch controlling the cell cycle in response to ionizing radiation-induced DNA double-strand breaks (DSBs). Carriers of ATM mutations are at increased risk for breast cancer. Since many anti-tumor chemotherapeutics used in breast cancer treatment also have the capacity to induce DNA DSBs, I have investigated the requirement for ATM in the cellular response to these agents. Using human ATM- positive and ATM-negative cell lines, I examined the cellular response to five common chemotherapeutics. Although I observed robust p53-dependent responses with 80% of the agents, only doxorubicin demonstrated a dependence upon AIM. Further characterization of the ATM-dependent response to doxorubicin revealed ATM-dependent p53 nuclear accumulation and phosphorylation of p53 on seven serine residues. I have also investigated doxorubicin-treated cell extracts for ATM autophosphorylation, ATM-dependent changes in p53-DNA binding affinity and alterations in the phosphorylation of downstream signaling molecules. Co-incubation of cells with antioxidants attenuated the doxorubicin-induced effect, suggesting that oxygen radicals may play a role in doxorubicin-induced activation of AIM-dependent pathways. Characterization of a role for AIM in the cellular response to anti-tumor chemotherapeutics could have significant implications for the treatment of breast cancer patients harboring mutations in ATM.
DTIC
Cancer; Damage; Deoxyribonucleic Acid; Mammary Glands; Mutations

20040050803 Walter Reed Army Medical Center, Washington, DC
Telemedicine Evaluation and Management of Lumbar Disk Herniation
Kuklo, Timothy R.; Jun. 2003; 6 pp.; In English
Contract(s)/Grant(s): MIPR-3GD3DP3082
Report No.(s): AD-A421137; No Copyright; Avail: CASI; A02, Hardcopy

The major benefit of this project is to improve patient care. Once this project has been validated, we can eliminate unnecessary travel to WRAMC, sending only those patients with emergent symptoms. Currently, we see all emergent and non-emergent cases and it can take up to 3-months to get an appointment to see a Spine Specialist. Once validated, we can reduce/eliminate the number of non-emergent cases allowing the Spine Specialists to see emergent patients in a more-timely manner. This will also reduce the long profiles and lost duty days associated with the long delay in seeing a specialist. How can your project reduce the cost of care? By reducing/eliminating the number of patients sent to WRAMC, we can reduce the cost of care. Prolonged profiles, lost duty days, air travel, hotel accommodations and meals would all be eliminated. Of the 1200 referral patients we see per year, about one sixth require surgical intervention. Additionally, development of this method of improving spine care access may also improve our ability to efficiently and effectively manage other spine problems and referrals.
DTIC
Health; Lumbar Region; Telemedicine

20040050804 Massachusetts General Hospital, Boston, MA
High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast
Foster, Rosemary; Aug. 2003; 11 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): DAMD17-01-1-0715
Report No.(s): AD-A421138; No Copyright; Avail: CASI; A03, Hardcopy

The role of neurofibromin in cellular growth control is complex with available data suggesting that neurofibromin is a bifunctional modulator that may regulate proliferation by coordinating the activities of numerous molecular pathways. One important step in clarifying neurofibromin's function is identification of critical interactors whose detection and characterization may define downstream targets of neurofibromin and regulators of its activity. The purpose of our research was identification of neurofibormin-associated proteins in multiple experimental systems using high sensitivity surface enhanced laser desorption/ionization (SELDI) mass spectrometry. Our primary efforts were aimed at overcoming the longstanding difficulties of manipulating normal and mutant forms of neurofibromin in mammalian cells and our progress has been severely limited by technical difficulties that prevented controlled exogenous neurofibromin expression in target cells. We have focused on using tetracycline-inducible HSV amplicon systems to re- introduce wild type neurofibromin into neurofibromin-deficient primary mouse embryo fibroblasts and human neuroblastoma cells. Our preliminary analyses in

NIH3T3 fibroblasts, neurobibromin- deficient MEFs, and human Schwann cells derived from NFl- associated tumors show tight control of tetracycline-inducible gene expression and suggest that the amplicon system will be a valuable tool in the identification of neurofibromin- associated proteins in a broad spectrum of cell types, including those that are pathologically relevant to the NFl phenotype.
DTIC
Drosophila; Mammals; Mass Spectroscopy; Sensitivity Analysis; Yeast

20040050805 Washington Univ., Seattle, WA
Quest: A New Approach to Molecular Staging of Tumors
Stephens, Karen; Aug. 2003; 32 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0721
Report No.(s): AD-A421139; No Copyright; Avail: CASI; A03, Hardcopy

Towards the goal of molecular diagnosis and staging of NFl-related tumors, we proposed to develop and validate a novel PCR-based method, termed QUEST, of rapid and quantitative identification of loci with increases of decreases in genomic copy number in MPNST. We have developed new as says that are sensitive and specific and allow the quantification of one gene copy versus two gene copies. The method was validated on constitutional DNA using assays that determined the copy number of the NFl gene. This methodology will be used for both loss (deletion) of DNA and gain (amplifications) of DNA in tumor cell lines and primary tumors. Assays are in development for the target areas of chromosome lp and l7q22- 24. The amplification and loss of chromosomal material at these regions was confirmed by high resolution karyotypingin two neuroblastoma-derived cell lines that will be employed to test the methodology on tumor tissues. We have made significant progress in assay design for quantification of genomic losses and gains. Implementation of these assays will now test the usefulness of our idea of using QuEST for defining specific losses and gains in tumors.
DTIC
Cancer; Cells (Biology); Diagnosis; Tumors

20040050807 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Effects of Pregnancy on the Army Physical Fitness Test
Usher, Stacy E.; May 2003; 44 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421141; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study was to determine the actual and perceived amount of time needed for the postpartum soldier to return to pre-pregnancy fitness condition as evidenced by APFT scores before and after pregnancy. There were three questions addressed in this study. First, what effect does pregnancy have on physical fitness levels as demonstrated by APFT scores? Second, how long does it take the postpartum soldier to return to pre-pregnancy fitness condition as measured by six month and one year postpartum APFT scores? And third, how long do the soldiers think it will take for them to return to pre-pregnancy fitness condition and perform as they previously did on the APFT? The findings from this study have implications for the education of healthcare providers, patients, and the Army regarding the effects pregnancy and delivery have on the human body, as well as enlightening them on the actual and perceived time needed for postpartum recovery and return to pre-pregnancy fitness condition. Using a quantitative descriptive design, data was gathered using a questionnaire asking demographic data, pregnancy information, exercise routines and beliefs, and APFT scores. Results revealed that complications, weight gain, and postpartum exercise practices had statistically significant effects on postpartum APFT scores. There were statistically significant differences between the pre-pregnancy and first post-pregnancy APFT scores as well. The percentage of women able to score equal or better on the first postpartum APFT compared to the pre-pregnancy APFT was 19%. The percentage of women able to do so on the second APFT was 31%. Seventeen percent of participants believed six months was enough time to return to pre-pregnancy physical condition. The significant differences in scores and personal beliefs stated by the soldiers may suggest that the current pregnancy profil
DTIC
Personnel; Physical Fitness; Pregnancy

20040050808 Madigan Army Medical Center, Takoma, WA
Expert System Utilization for Behavioral Health
Gahm, Gregory A.; Jun. 2003; 7 pp.; In English
Contract(s)/Grant(s): MIPR-3GD3E73091
Report No.(s): AD-A421142; No Copyright; Avail: CASI; A02, Hardcopy

In behavioral health (BH), considerable resources are allocated to the basic, standard processes of conducting initial evaluations. Patients present to BH clinics much like they do to an emergency room or sick call; problems range from minor to severe, urgent to routine, administrative to medical needs. Triaging patients is required to determine an appropriate immediate disposition. The critical yield of the evaluation is actuarial data used to predict risk. Historically, this has not been optimized for either resource allocation or quality of care, resulting in delays in service, additional cost to provide care, and inconsistent scientific application of BH. This project originally proposed to apply decision algorithms to an automated intake system to directly address quality, cost and access limitations. The key tasks were: 1. Defining an explicit knowledge base used to make triage and assessment decisions. 2. Providing a detailed analysis of current best practices and evidence-based decision- making criteria. 3. Creating symbolic logic using the identified criteria. 4. Designing output that is useful to providers. 5. Systematically evaluating the decisions and logic against clinician judgment. 6. Integrating the outcome of the project with larger initiatives (BHAVRS, DCSP, CHCSII).
DTIC
Expert Systems; Health

20040050811 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Adherence to Hypertension Management Recommendations for Patient Follow-Up Care and Lifestyle Modifications Made by Military Healthcare Providers
Collins, Timothy J.; May 2000; 82 pp.; In English
Report No.(s): AD-A421146; No Copyright; Avail: CASI; A05, Hardcopy

The purpose of this study was to describe military healthcare providers adherence to nationally recognized hypertensive patient guidelines concerning lifestyle modifications and follow-up instructions after an initial diagnosis of hypertension. The importance of monitoring high blood pressure (follow-up) and maintaining blood pressure control was examined. Research has shown that while hypertension follow-up is being performed, physicians are not following established guidelines aggressively enough in identifying situations in which more robust management may be appreciated. Neuman's Systems Model was used as the conceptual framework to guide this study. Data was collected utilizing a checklist developed by the researcher according to national treatment recommendations. Using a descriptive quantitative design, eight research questions were investigated during a retrospective chart review on a convenience sample of 35 medical records at an Air Force medical treatment facility located in the northeast USA. Military Healthcare Providers fared well (94%) in maintaining oversight of their hypertensive patients by providing excellent follow-up management. However, lifestyle modification prescriptions to their patients, were less favorable. There was a low compliance with weight loss instruction (36%), the limitation of alcohol use (57%), and need to increase physical activity (38%), reduce sodium intake (6%), and maintain adequate potassium (3%), calcium (9%), and magnesium (0%). Patients in this study were also not provided with adequate information about decreasing dietary fat (17%). However, Military Healthcare Providers were exceptional in both identifying and counseling cigarette smokers (100%). This thesis revealed a better compliance to JNC VI (1997) guidelines by Advanced Nurse Practitioners than physicians did in all areas of instructions.
DTIC
Hypertension; Medical Services; Patients

20040050813 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
A Comparison of Diabetes Management in a Federal Prison with the National Standards of Care Published by the ADA in 1998
Giroux, Virginia A.; May 2000; 59 pp.; In English
Report No.(s): AD-A421148; No Copyright; Avail: CASI; A04, Hardcopy

Diabetes Mellitus (DM) affects 16 million Americans, or 6.2% of the population, and costs the U.S. $120 billion annually. Specifically, within the Federal Bureau of Prisons (FBOP), DM affects 5.7% of the total inmate population. It is associated with significant morbidity and mortality. It is the leading cause of blindness, non-traumatic lower extremity amputations, and end-stage renal disease. Results of the Diabetes Control and Complications Trial have shown that intensive treatment can significantly reduce the debilitating and costly long-term complications associated with the disease. Managing a chronic illness such as DM can best be accomplished by following nationally recognized standards of care such as those published by the American Diabetes Association (ADA). The purpose of this study was to describe the medical management for inmates diagnosed with DM within the FBOP, and compare this to the national standards of care published by the ADA in 1998. To measure adherence to the ADA standards, this descriptive quantitative study utilized the Diabetes Quality Assurance (DQA) Checklist to perform a chart review in a federal prison outpatient clinic. The DQA Checklist major categories include referrals, blood glucose evaluation, diet and exercise, foot care, cardiovascular risk factors, and laboratory tests. Cardiovascular risk

factor assessment, cholesterol and triglyceride measurement, nutrition assessment, opthalmology and ECG referrals were at greater than 87% adherence. However, the degree of adherence was significantly lower in the areas of glycohemoglobin measurement, documented foot exam, HDL and LDL cholesterol measurement.
DTIC
Ada (Programming Language); Medical Services; Metabolic Diseases

20040050815 Virginia Mason Research Center, Seattle, WA
Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms
Nelson, Brad H.; Aug. 2003; 10 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0733
Report No.(s): AD-A421153; No Copyright; Avail: CASI; A02, Hardcopy

We are developing a mouse model for ovarian cancer that will allow monitoring of the in vivo activities of tumor- specific T cell clones as they encounter ovarian tumors in vivo. We propose to 'tag' the neu oncogene with two identified T cell epitopes so as to confer recognition by available T cell receptor (TCR) transgenic T cells. When expressed in the murine ovarian tumor cell line IDS, epitope-tagged neu (designated neuo(Tl/0T2) should induce formation of aggressive ovarian adenocarcinomas that express the epitope tags and hence are recognizable by adoptively transferred TCR transgenic T cells. We successfully made the neuo Tl/0T2 expression construct, but found it to be overly immunogenic in vivo such that tumors were spontaneously rejected. Therefore, we derived a third generation 1D8 tumor cell line that has a shorter tumor latency and decreased expression of MHC Class I, which should make it less immunogenic. Meanwhile, we have commenced adoptive T cell transfer experiments using a convenient, transplantable lymphoma model. With this model, we are investigating the phenomenon of antigen spreading that results after adoptive transfer of tumor-specific T cells. Finally, Cbl-b -/- mice have been obtained and are currently being backcrossed onto the B6 background for Aim 3.
DTIC
Anatomy; Antigens; Cancer; Genetics; Immunity; Lymphocytes; Mice; Tumors

20040050816 Johns Hopkins Univ., Baltimore, MD
Proton MR Spectroscopic Imaging in NF-1
Barker, Peter B.; Jul. 2003; 13 pp.; In English
Contract(s)/Grant(s): DAMD17-01-1-0713
Report No.(s): AD-A421154; No Copyright; Avail: CASI; A03, Hardcopy

Neurofibromatosis Type 1 (NF-l) is the most common autosomal dominant genetic disorder, affecting the skin, central (CNS) and peripheral nervous systems. Children with NF- l have an increased risk of developing significant learning disability (LD), cognitive impairment, and optic or brain stem gliomas. Cerebral magnetic resonance imaging (MRI) in NF-l reveals regions of high signal intensity (often called 'unidentified bright objects', or UBOs) . The pathophysiology of UBOs is poorly understood, and it is controversial to what extent they are involved in cognitive impairment. The aims of this proposal are to characterize the underlying metabolic abnormalities in NF-l with proton MR spectroscopic imaging (MRSI). We have developed a rapid, quantitative MR spectroscopic imaging (MRSI) protocol for the evaluation of cerebral metabolite levels in NF-l. Metabolite levels will be determined both in UBOs and other brain regions, both in order to improve understanding of the etiology of UBOs, and to understand the relationship between regional brain metabolism and LD. 60 subjects with NFl and 60 control subjects will be evaluated with proton MRSI and detailed neuropsychological testing. Ultimately, proton MRSI may be a useful test for identifying children with NF-l at risk of developing LD, and also help in distinguishing UBOs from other, malignant lesions which require therapeutic intervention.
DTIC
Disorders; Imaging Techniques; Magnetic Resonance; Mental Health; Nervous System; Neurology; Protons; Spectroscopy

20040050817 Academy of Health Sciences (Army), Fort Sam Houston, TX
Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center
Sherman, David A.; Apr. 2002; 41 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421155; USAMDCS-33-02; No Copyright; Avail: CASI; A03, Hardcopy

Wilford Hall Medical Center has the capacity to enroll more patients into its TRICARE Prime program, and the catchment area has nearly 80,000 beneficiaries who have not enrolled in TRICARE Prime. Increasing enrollment in WHMC s TRICARE program would serve several purposes: first, it would help WHMC meet the Air Force Surgeon General s goal of recapturing workload currently lost to the civilian sector. Second, it may serve as a pipeline to the WHMCGME program, which is

currently losing market share to other hospitals. Third, it may reduce TRICARE costs by providing care more economically within the direct-care system. This research project was conducted to determine whether or not a WHMC satellite TRICARE Clinic could increase enrollment while decreasing TRICARE costs enough to offset the expenses associated with creating and operating the clinic. Using net present value calculations and TRICARE bid-price adjustment figures, it was determined that such a clinic would not be cost-effective. However, when considering non-financial factors, such a clinic maybe deemed worthwhile, as it would likely increase the number of beneficiaries enrolled in TRICARE Prime and TRICARE Plus, as well as provide an additional source of patients for Graduate Medical Education training programs.
DTIC
Hospitals; Medical Services; Military Operations; Surgeons

20040050818 Army Southeastern Regional Medical Command, Fort Gordon, GA
AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes
Suykerbuyk, Robert A.; Jun. 2003; 5 pp.; In English
Contract(s)/Grant(s): MIPR-3GD3DD3074
Report No.(s): AD-A421156; No Copyright; Avail: CASI; A01, Hardcopy

Contingent on obtaining further funding the plan remains consistent with that in the initial proposal. Evaluation of CHCS laboratory records for diabetic patients assigned to the Department of Family and Community Medicine at Eisenhower Army Medical Center will be collected in two groups over a one year period. The data to be collected for both groups will include Ale's, lipid panels, micro- albumin, ophthalmology evaluations and podiatry evaluations, diabetic medications and the number of visits for the patient during the study period. The first group will consist of CHCS data collected for a six month period prior to the deployment of the system. This group will serve as the control group and will be representative of the current level of guideline compliance within the Department of Family and Community Medicine. The second group will consist of information for a six month period after system deployment and will serve as the intervention arm of the study. The groups will be matched for the type of diabetes mellitus (oral medications vs. insulin) and the number of visits. Statistical analysis with SPSS to evaluate DoD/VA Diabetic guideline compliance over this one year period will then be conducted by comparing the two groups. External validation of compliance will occur utilizing data from PASBA.
DTIC
Diseases; Management Planning; Management Systems; Medical Services; Metabolic Diseases; Network Analysis; Prototypes

20040050819 Air Univ., Maxwell AFB, AL
Malignants In The Body Politic: Redefining War Through Metaphor
Stickle, Douglas R.; Jun. 2002; 69 pp.; In English
Report No.(s): AD-A421157; No Copyright; Avail: CASI; A04, Hardcopy

In the aftermath of September 11th, President Bush declared the dawn of a new kind of war. He has repeatedly emphasized that means and measures of success in this new war will differ greatly from wars past. Yet, if this war on terrorism is unlike any other war, then what is it like? From the public statements of high-ranking US officials, metaphorical answers emerge: terrorism is a metastasizing cancer, a plague, a threat from which we are not immune. This paper explores the analogies of immunity, infection, and cancer. In doing so it addresses the classic strategic questions, what is the nature of the enemy, and what is the nature of the fight? In the never-ending battle against microbes and 30-year old 'war on cancer,' the enemies are microbes and malignancies threats from without the body and threats from within. In the context of the announced 'war on terrorism,' I convert these biological and medical themes for reflective contemplation and conclude that the administration might look further to the language of disease to better communicate the challenges of the war on terrorists.
DTIC
Cancer; Diseases; Warfare

20040050820 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease
Quigley, John F.; Aug. 20, 2003; 148 pp.; In English
Report No.(s): AD-A421159; No Copyright; Avail: CASI; A07, Hardcopy

Impaired autonomic-cardiac regulation, as defined by reduced levels of heart rate variability (HRV), is an independent predictor of death in patients with coronary artery disease (CAD) and a history of myocardial infarction. Moreover, transient

shifts in HRV have been observed before the acute onset of ambulatory myocardial ischemia in CAD patients. The present study investigated whether or not changes in autonomic-cardiac regulation: (1) were associated with altered hemodynamic regulation in CAD patients; (2) could identify CAD patients at-risk for ambulatory myocardial ischemia; or (3) were related to changes in physical exertion and heart rate levels before the onset of ambulatory myocardial ischemia. Fifty-three patients with documented CAD (44 men; mean age 65 years) participated in 48-hours of ambulatory electrocardiographic (Holter), physical activity, and blood pressure monitoring. Holter tapes were analyzed for evidence of myocardial ischemia and were used to generate several indices of HRV, including markers for sympathetic and parasympathetic tone, and their ratio, sympathovagal tone. Results indicated that CAD patients with lower levels of HRV (n = 26) had significantly higher levels of heart rate than did patients with preserved levels of HRV (n = 27; p < .05), whereas HRV was found to be unrelated to patients blood pressure levels (p s > .05). Contrary to predictions, ischemic CAD patients (n = 9) were found to have significantly higher levels of HRV and significantly lower levels of heart rate when compared to non-ischemic patients (n = 44; p s < .05). These differences were not related to patients medication regimens, ejection fraction, or history of reperfusion procedures (p s > 05). Ischemic and non-ischemic CAD patients did not differ in terms of their HRV, heart rate, or blood pressure levels during prescribed non-ischemic periods of keepi

DTIC

Arteries; Autonomic Nervous System; Coronary Artery Disease; Coronary Circulation; Heart Diseases; Hemodynamic Responses; Ischemia; Medical Services; Myocardium; Patients; Stability

20040050821 Central Texas Veterans Health Care System, Austin, TX

Correlates for Utilization of Preventive Medicine Through the Use of Clinical Reminders at the Central Texas Veterans Health Care System

Milligan, Jeffery L.; Apr. 2002; 50 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421163; AMDCS-38-02; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study was to identify variables that serve as predictors of a clinician s success in utilizing the clinical reminders software package to implement appropriate preventive medicine measures and meet performance standards. The sample consisted of 45 primary care clinicians practicing at the Central Texas Veterans Health Care System (CTVHCS). The relationship between fifteen predictor variables and two dependent variables (completion rate and success in meeting the performance measure) was assessed on a macro level and a micro level. Significant correlations at the macro level included: years out of professional school, gender, place of practice, patients treated per day, clinician s educational background, and clinician s age. At the micro level, significant correlations included: years practicing at the CTVHCS, years out of professional school, gender, patients treated per day, board certification, clinician s educational background, and clinician s age. The significant correlations and associated regression lines allowed the author to develop a clinician profile that identifies characteristics of clinicians more likely to utilize clinical reminders to implement preventive measures.

DTIC

Health; Psychology

20040050822 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

Blood Sample Reliability Using Infusing Intravenous Lines

Himberger, John R.; May 2001; 92 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421164; No Copyright; Avail: CASI; A05, Hardcopy

Patients receiving care, whether arriving in the Emergency Department, or admitted to the ward, often have intravenous lines for the purpose of treatment. Yet, even with a preexisting vascular access device being available, we continue to use phlebotomy as the gold standard for blood specimen collection. If nurses and medical technicians could use a preexisting intravenous lines for blood collection there would be a reduction in patient care costs, increase in patient comfort, and increase in expeditious care. The purpose of this study was to investigate the interchangeability of specimens collected using infusing intravenous lines versus traditional phlebotomy collection methods. This study was designed to be a quasi-experimental operational replication of a study completed in 1999 by Himberger and Himberger (2001). Their study evaluated the interchangeability of 12 commonly performed laboratory tests and concluded the two collection methods yielded interchangeable results. Following Institutional Review Board approval a sample of 30 patients was used for the study. Enrollment occurred through the Malcolm Grow Medical Center Emergency Department. Subjects were identified and informed consent was obtained, the specimens were collected and tested. The results were evaluated using a paired t test and agreement analysis method and it was determined that specimens collected through infusing intravenous lines, simultaneously with phlebotomy, are interchangeable using this protocol.

DTIC

Blood; Bottles; Intravenous Procedures; Reliability

20040050823 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Chlamydia Screening Decision Study
Rogers, Janet; May 2000; 68 pp.; In English
Report No.(s): AD-A421169; No Copyright; Avail: CASI; A04, Hardcopy

Chlamydia is a prevalent infection among the sexually active. Studies have shown that chlamydia is a health problem for military women. The USA Center for Disease Control recommends screening asymptomatic women under the age of 25. Many studies show that screening asymptomatic young women uncovers significant numbers of infections. Other studies show that many young women are not being screened for this disease. This qualitative study investigates what factors influence providers decisions to screen for chlamydia. A record review of 28 active duty women who received pelvic exams at a military health clinic for chlamydia screening and chlamydia prevalence was performed to enrich the interpretation of the data. Three healthcare providers who perform pelvic exams were interviewed. Data was analyzed guided by using Brooks Theory of Intrapersonal Perceptual Awareness (BTIPA) for factors influencing their decisions to screen for chlamydia. The interviews were studiously reviewed for themes and compared to the themes of perception, judgment, and intrapersonal perceptual awareness in accordance with BTIPA.
DTIC
Bacteria; Decision Making

20040050824 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Changes in Weight Experienced by Female Inmates in the Federal Bureau of Prisons
Massie, Jodi A.; May 2000; 91 pp.; In English
Report No.(s): AD-A421171; No Copyright; Avail: CASI; A05, Hardcopy

Incarcerated females are an under-studied population with little published research on weight changes or obesity. A sample of 98 female inmates, at a Federal Bureau of Prisons complex, was used in this comparative descriptive study of weight, body mass index (BMI), changes among inmates in different custody level institutions, and with different sentence lengths. Data were collected by record reviews retrospectively over a three-year period and the length of incarceration. This study is based on Roy's Adaptation Model. The total sample was heavier on admission than the general public. The sample shifted from normal to overweight individuals while the percentage of obese inmates showed small fluctuations. The mean BMI increase for the three-year period was statistically significant ($t = 2.05$, $p = 0.04$). The period of incarceration, which covered a longer time and had less missing data, produced results with greater statistical significance than the three-year period ($t = 2. 91$, $p = 0.004$). In-custody inmates gained weight and had a significant mean BMI increase ($t = 2.05$, $p = 0.05$), while out-custody inmates experienced a non-significant BMI increase ($t = 0.90$, $p = 0. 38$). Independent ttests comparing BMI changes by custody level were not significant ($t = 0.96$. $p = 0.34$). Inmates with shorter sentences (<100 months) had a non-significant mean decrease in BMI ($t = 0.04$, $p = 0.97$), while inmates with longer sentences (100 months) had a significant mean increase in BMI ($t = 2.52$, $p = 0.02$). Independent t-tests comparing the BMI changes by sentence length yielded $t = 1.13$, $p = 0.26$ for 1996-1998, and $t = 2.06$, $p = 0.05$ for the length of incarceration. Inmate BMIs by age followed the trends experienced by the general public, but BMIs by ethnicity did not.
DTIC
Body Weight; Females

20040050825 Air Force Hospital, Lackland AFB, TX
Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation
Van De Walle, Steven P.; Apr. 1999; 37 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421173; HCA-33-99; No Copyright; Avail: CASI; A03, Hardcopy

A computer simulation was used to study the effects of various improvement initiatives on length of stay (LOS) at the Wilford Hall Medical Center (WHMC) emergency Department (ED). The WHMC ED recently moved into a promising new facility. The new facility is three times the size of the old structure; it has more treatment areas, a collocated Minor Care Clinic (MCC), and in-house ancillary capabilities. All of these represent vast improvement over the old operation. However, there are inefficiencies associated with operating in the new environment. This study analyzed various local and national initiatives and their potential impact WHMC ED average LOS. Specifically, it examines the following initiatives: reduce consult response times, reduce x-rays by implementing the Ottowa knee and ankle rules, reduce lab tests ordered, reduce admission delays, and order ancillary tests more timely. The outcome of the study is promising; all initiatives reduced LOS, indicating improved efficiency and enhanced patient care.
DTIC
Computerized Simulation; Emergencies; Health; Medical Services

20040050827 Academy of Health Sciences (Army), Fort Sam Houston, TX
The Development of a Backfill Analysis Tool in the Army's Great Plains Regional Medical Command
Hallmark, J. S.; May 12, 2003; 97 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421175; No Copyright; Avail: CASI; A05, Hardcopy

The purpose of this study was to analyze backfill and PROFIS tasking data from fiscal year 2001 and develop a methodology to estimate costs associated with backfill missions within GPRMC, which then could be adequately resourced. The future arrival in fiscal year 2004 of the next generation of TRICARE Managed Care Support Contracts (TNEX), and the subsequent major financial structural modifications in TNEX will drastically increase a commander's exposure to financial risk. A clear understanding of the nuances and relationships between financing and Military Healthcare System (MHS) unique readiness issues is needed to assist the GPRMC commander in executing the soundest financial decisions possible. The resulting process, coined the Backfill Analysis Tool (BAT), provides a comparative view of expected travel costs in conjunction with TRICARE Prime leakage to the network; facilitating a holistic financial comparison. The results of the study indicate that two of five real-world taskings under study could have been supported with reduced costs to the region. The BAT process provides GPRMC staff the opportunity to routinely factor in leakage costs into the backfill decisionmaking process.
DTIC
Great Plains Corridor (North America); Health

20040050828 Bassett Army Community Hospital, Wainwright, AR
Strategic Analysis and Plan for Implementing Telemedicine at Fort Greely
Bolton, Karl C.; Mar. 2003; 104 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421176; HCA-35-03; No Copyright; Avail: CASI; A06, Hardcopy

To improve access to care the Alaska Federal Healthcare Partnership established a telemedicine program. Medical Department Activity (MEDDAC) Alaska is considering extending their portion of the telemedicine program to cover Fort Greely and the surrounding area. To best accomplish this, a strategic analysis and business case analysis was conducted. Introspective strategic analysis tools revealed an organization that is capable of supporting a telemedicine program at Fort Greely. Prospective strategic analysis tools lead to an aggressive stance for implementing telemedicine. An analysis of three deployment courses of action suggests that either an AFHCAN and Commercial Off the Shelf (COTS) hybrid, or a pure COTS system would best serve the organization. A simple business case analysis resulted in a break-even point using the NPV method at five years for 473 beneficiaries served; for the expected population of 300 the project loses $117,505.48 over the same period. Recommendations for implementation include fixing MEDDACs existing telemedicine program, establishing measures for success, and deploying an AFHCAN and Commercial Off the Shelf (COTS) hybrid system.
DTIC
Health; Telemedicine

20040050829 Evans Army Community Hospital, Fort Carson, CO
Optimizing the Internal Medicine Clinic at Evans Army Community Hospital
Bonilla, Jose A.; Jan. 2003; 68 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421177; HCA-13-03; No Copyright; Avail: CASI; A04, Hardcopy

Although the Department of Defense (DoD) has established access to care standards for military health care organizations and their treatment facilities, many facilities may face challenges in meeting these standards. In fiscal year (FY) 2002, the Internal Medicine (IM) clinic at Evans Army Community Hospital, Fort Carson, Colorado, failed to meet access to care standards for routine appointments, and was only marginally successful in meeting standards for urgent appointments. Because of the inextricable link with optimization and access to care, this study is an initiative that utilizes business operational analysis in an effort to optimize operations and maximize access to care to the beneficiaries enrolled in the Internal Medicine clinic. The results of this study suggest that by reorganizing primary care managers (PCMs) empanelment, reassessing the full time equivalent (FTE) for each PCM, improving the provider to support staff ratios, and improving providers template management, access to care will be substantially improved for enrolled beneficiaries.
DTIC
Clinical Medicine; Health; Hospitals; Medical Services; Military Operations

20040050830 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis
Caohuy, Hung; Jan. 2002; 170 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421178; No Copyright; Avail: CASI; A08, Hardcopy

Numerous studies have shown that regulated exocytosis is activated simultaneously by calcium, guanosine triphosphate (GTP) and protein kinase C (PKC), and that this process is specifically inhibited by botulinum toxins (BoNTs). Although phenomenologically well known, the specific sites of action for these agents in the late stage of exocytosis, membrane fusion, remain unknown. In this research project, we combined both in vitro and in vivo approaches to directly test the effects of these agents on annexin 7. Annexin 7 (ANX7) is a calcium-dependent GTP-activated membrane fusion protein. In a reconstituted membrane fusion system using artificial liposomes, ANX7 membrane fusion activity is substantially increased by the combination of individually optimal concentration of guanine nucleotide and PKC. This increasing ANX7 activity can be distinguished by a simple additive model when comparing activation by either guanine nucleotide or PKC alone. In other in vitro assays, the binding of GTP and its non-hydrolyzable analogues to ANX7 significantly enhance PKC phosphorylation, and conversely PKC phosphorylation markedly potentiates the binding and hydrolysis of GTP by ANX7. While certain other kinases label ANX7 efficiently, they do not substitute for PKC in potentiating GTP binding or membrane fusion. To correlate the in vitro data with exocytotic events in cells, we examined the biochemical profile of endogenous ANX7 in secreting adrenal chromaffin cells. In vivo, both the ratio of ANX7-bound GDP/ GTP as well as ANX7 phosphorylation by PKC change in proportion to the extent of catecholamine release from stimulated chromaffin cells. Thus, the stimulatory actions of calcium, GTP and PKC appear to specifically converge on ANX7 to drive membrane fusion activity occurring during exocytosis.
DTIC
Bacteria; Calcium; Cells (Biology); Clostridium Botulinum; Guanines; Guanosines; Membranes; Proteins; Toxins and Antitoxins

20040050831 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator
Williamson, Richard A.; Oct. 2000; 54 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421179; No Copyright; Avail: CASI; A04, Hardcopy

Drawover anesthesia is not a new concept, it dates to the earliest use of volatile anesthetic agents. William T.G. Morton used ether and a drawover vaporizer on October 16, 1846 in the first public demonstration of volatile agent anesthesia. Ether was widely used as a volatile anesthetic in the military from 1846 until the end of World War II. Drawover vaporizers were used on a limited basis during the Viet Nam War. As a result of success with drawover anesthesia experienced by British Armed Forces during the Faulklands War the USA military gained a renewed interest in this device. Currently the Ohmeda Universal Portable Anesthesia Complete (UPAC) drawover device is used by the USA military. Patient simulation is a relatively new tool in teaching anesthesia students. Teaching drawover anesthesia using the patient simulator may have potential advantages. In this study the accuracy of anesthetic delivery by the UPAC as measured by the RASCAL was assessed. The anesthesia patient simulator provided an accurate source of negative inspiratory force to operate the UPAC. The study found that the UPAC delivers accurate and consistent concentrations of isoflurane when used with the anesthesia simulator. However at tidal volumes of 900ml after prolonged use expired concentrations of isoflurane exceeded inspired. This may be a result of absorption of isoflurane into the rubber and plastic components of the anesthesia simulator. It may also have been the result of large tidal volumes and increased amounts of isoflurane drawn into the mechanical lung of the simulator resulting in a concentration effect due to ventilatory limitations of the simulator.
DTIC
Anesthesia; Anesthetics; Simulators; Vaporizers

20040050832 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening
Moore, Angelo D.; May 2002; 85 pp.; In English
Report No.(s): AD-A421180; No Copyright; Avail: CASI; A05, Hardcopy

The purpose of this study was to describe the knowledge base, perceived threats, benefits, barriers, and self-efficacy of prostate cancer screening. The Health Belief Model (HBM) was the theoretical framework that guided this study. This study utilized a convenience sampling of 234 males in the National Capital Area. A 58-item EPPS (Edwards Prostate Cancer Perception Screening Instrument) questionnaire was distributed to all interested participants. The study used both inferential and descriptive statistics to report findings. The majority (93%) of the participants were very knowledgeable about prostate cancer and prostate cancer screening as indicated by high scores on the knowledge scales. However, the majority of the study population appeared to be unsure of when to start screening for prostate cancer. All concepts of the HBM (perceived threats, benefits, barriers, and self-efficacy) appear to affect screening patterns as indicated by high mean scores on the perception scales. The majority (89%) of the participants were very trusting of their health care provider. They also reported obtaining

most of the information about their health care from their provider. Two thirds of the participants reported screening annually for prostate cancer. Significant differences were noted in the screening pattern between Caucasian and the African American groups (p= .001). Contrary to previous studies, this study found that African American males screened for prostate cancer more frequently than Caucasian males. The information gained in this study can be helpful in providing guidance to the researchers in developing educational programs to encourage regular participation in prostate concer screening.
DTIC
Cancer; Health; Human Behavior; Males; Prostate Gland; Psychology

20040050833 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting
McNaughton, Sandra N.; May 2000; 63 pp.; In English
Report No.(s): AD-A421181; No Copyright; Avail: CASI; A04, Hardcopy

It has been estimated that 90,000 deaths related to unintentional injuries occur in the USA each year. Among the unintentional injuries, head injuries were a major contributor to injury-related mortality and morbidity. The purpose of this research was to investigate the current practices involving head injury prevention in Army outpatient care settings. This study used a descriptive quantitative design to examine whether primary care providers in two Army outpatient care settings provided counseling on safety helmet use involving individuals with a sports related head injury. Active duty soldiers and beneficiaries between the ages of 18- 44 years were selected for study inclusion in order to coincide with the army population. A total of 607 medical records were reviewed using a checklist developed by the researcher. Fifty-one records met the criteria for inclusion in the study and 15 of the medical records were related to sports injuries. Only two of the records contained documentation of head injury counseling at the time of treatment for the head injury. Primary care provider's awareness of preventive counseling is encouraged to optimize the health and well being of our military population today.
DTIC
Head (Anatomy); Helmets; Injuries; Medical Services; Patients; Personnel; Prevention; Procedures; Safety

20040050834 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center
Tuitele, Barbara A.; May 2000; 60 pp.; In English
Report No.(s): AD-A421182; No Copyright; Avail: CASI; A04, Hardcopy

Studies show that motorcycle and bicycle helmets reduce injuries and fatalities and lower health care costs. A Department of Defense (DoD) survey conducted in 1995 found that helmet use among active duty military motorcyclists and bicyclists was below the standards set by Healthy People 2000 objectives. In the USA, head injuries are the primary cause of death for both motorcycle crashes (3,500 death per year) and bicycle crashes (900 deaths per year). In addition, approximately one half of rollerblading deaths are due to head injuries. Head injuries account for more than 50, 000 deaths annually and the same number of head injury victims are left with disabilities each year. Given these alarming statistics, this researcher wanted to know what primary care providers in the Air Force are doing to educate there patients on head injury prevention. The purpose of this descriptive study was to examine safety helmet use and the current practices in head injury prevention in an Air Force Medical Center. There were a total of 65 active duty members that had diagnosis codes identifying them as having been treated for a head injury at Malcom Grow between January 1, 1998 and November 30, 1999. Of these 65 individuals, data was available for review on 55 of these 65 individuals. The findings from this data was unexpected. Only one of these 55 individuals received head injury in which a helmet is required or recommended. Most head injuries that involved a sport were sustained while playing basketball, football or baseball. Most common head injuries that did not involve a sport were sustained as a result of a fight or assault, or in a motor vehicle accident.
DTIC
Armed Forces (United States); Helmets; Injuries; Medical Services; Personnel; Prevention; Procedures; Safety

20040050835 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments
Mitchell, Marguerite T.; May 2001; 79 pp.; In English
Report No.(s): AD-A421183; No Copyright; Avail: CASI; A05, Hardcopy

After the Cold War the military deployment rate has increased dramatically despite the 39% decrease of armed forces personnel. One of the goals established in the Global Engagement: A Vision for the 21st Century Air Force document, is that

all active duty airmen will be required to maintain a high level of medical readiness. Presently only Air Force members on deployment status are routinely screened for medical readiness. This descriptive research concentrated on the Air Forces core competency of Rapid Global Mobility. The goal of this study was to assess a sample population for the percent of medical readiness for a shortfall mobilization, describe pertinent discrepancies if any, and to determine if there was a significant differences in medical readiness by gender, rank or age. The hypothesis is that 100% of active duty Air Force personnel, not on deployment status, who meet worldwide qualifications, will be medically ready for a less than 72-hour notice deployment. A total of 300 outpatients medical records were randomly chosen and reviewed, 100 from each of the three different major commands. Only 64% of the sample population was medically ready for a shortfall deployment. Thirty-two percent of the sample required further evaluation. If documentation was made as to whether the members still met worldwide qualifications after each outpatient visit the overall readiness percentage could be greatly improved.
DTIC
Armed Forces (United States); Deployment; Maintainability; Medical Science; Personnel

20040050836 Walter Reed Army Medical Center, Washington, DC
The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management
Cooper, Kevin E.; Jun. 2003; 120 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421184; HCA-9-03; No Copyright; Avail: CASI; A06, Hardcopy

This study analyzed the variables that impact the capability of the Armys medical equipment sets to support the real-world treatment requirements of forward surgical teams. A comparison of the two existing medical component listings for these sets, i.e. unit assemblage 0267 (published in 1996) and unit assemblage 2267 (published in 2002), provided a detailed listing of differences between these two sets and highlighted the need for adapting medical sets to changing clinical requirements. In addition, first-hand observation of the Army s trauma training program in Miami, Florida, provided data on medical items consumed in a civilian, real-world trauma treatment facility. Comparison of this data against the established Army listings identified discrepancies between published listings and real-world requirements. The answer to the research question proposed was that current medical equipment sets for forward surgical teams do not fully support the real-world treatment requirements of the Armys forward surgical teams.
DTIC
Assemblies; Clinical Medicine; Logistics; Medical Equipment; Medical Services; Military Operations; Policies; Supplying; Surgical Instruments

20040050837 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities
Joswick, Jessetta K.; Sep. 1998; 93 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421186; No Copyright; Avail: CASI; A05, Hardcopy

In the USA Army nurse anesthetists have been the primary providers of anesthesia cases in all the wars, conflicts, and peace keeping missions. Yet little has been written about these nurses. The focus of this research study is to describe the role of the Certified Registered Nurse Anesthetist (CRNA) in surgical centers, small, medium, and large medical treatment facilities (MTF) in the USA Army. A descriptive survey tool was designed and mailed to anesthesia departments, at each USA Army MTF. Twenty eight of 33 MTFs returned the surveys; achieving an 85% return rate. The data showed three large MTFs have more anesthesiologists than CRNAs. One of the large MTFs has 18 anesthesiologists and only eight CRNAs. The ratio of anesthesiologists to CRNA for the surgical centers was 0:2 and the small and medium MTFs ratio was 1:2. The large MTFs were found to operate with a very high anesthesiologist to CRNA ratio from 1:1 to 2:1. The data did not show any increase in productivity, as measured by case per provider per year, at the facilities with the higher ratio of anesthesiologists to CRNA. The data showed cases per provider per year was less in the large MTFs compared to those with lower staffing ratios. There is much overlap between the roles of the two providers; In some places they are used interchangeably. Currently the smaller facilities have the most experienced CRNA providers and the least experienced anesthesiologists. The data also shows that the CRNAs remain on active duty in the Army longer than the anesthesiologists. This research provided base line data on the role of anesthesia providers in surgical centers, small, medium and large MTF in the US Army. The data implies that CRNAs function more independently at smaller MTFs in the Army. However, the best mix of providers warrants further investigation.
DTIC
Anesthesia; Medical Personnel; Personnel; United States

20040050838 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents
Davis, Dawnavan S.; Oct. 2, 2003; 123 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421189; No Copyright; Avail: CASI; A06, Hardcopy

Research suggests that body dissatisfaction can develop by first-grade and girls tend to be less satisfied with their bodies compared to boys. However, no studies have examined the effects of race and gender and parental factors on body image among firstgraders. Fifty-eight child/parent dyads participated in the current study. Children were given a silhouette measure to assess body image. The FRS, EDI, White/Black Racial Identity Scales, and AAAS were administered to parents. There was no main effect for race on child body ideal, F(1,53)= .43, p= .52, and body satisfaction, F(1,53)= 2. 20, p=. 14. No main effect emerged for gender on child body ideal, F(1,53)= 1.86, p= .18, or body satisfaction, F(1,53)= . 37, p= .55. Only a few significant correlations emerged between child body image and parental factors. Other factors such as mass media and peer group may be more salient in influencing body image among young children.
DTIC
Africa; Body Weight; Children; Psychology; Races (Anthropology)

20040050839 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection
Schoneboom, Bruce A.; Jan. 2000; 153 pp.; In English
Report No.(s): AD-A421190; No Copyright; Avail: CASI; A08, Hardcopy

Venezuelan equine encephalitis virus (VEE) is an emerging pathogen with epizootics and epidemics occurring in the Western Hemisphere. Recent outbreaks in South America have caused significant morbidity and mortality among domesticated livestock and surrounding human communities. VEE pathogenesis is characterized by infection of the central nervous system (CNS) where the virus targets neurons, resulting in significant neurodegeneration. VEE encephalitis can result in profound neurological deficits or even death. Because of the devastating nature of this disease and the lack of interventional therapies, it is important to understand the intricate details of VEE neuropathogenesis in order to identify targets for treatment to effect a cure. Inflammation has recently been implicated as a component of neurodegeneration. Inflammation in the CNS in response to acute infections is a protective mechanism that attempts to contain and clear neuro-invasive pathogens, however this upregulation of proinflammatory genes may be deleterious to surrounding neurons. The combined effects of direct infection and inflammation may be additive or synergistic in the amount of injury sustained in the CNS. Glial cells are of particular importance in the CNS immune response. These resident cells of the CNS have intimate associations with neurons and regulate the CNS milieu. One type of glial cell is the astrocyte. Astrocytes are found in vast numbers in the CNS and have essential functional roles in maintaining a healthy environment for neurons. Further, astrocytes play a role in the pro-inflammatory innate immune response. To identify the role of astrocytes in VEE infection, I characterized astrocyte susceptibility to VEE infection using an in vitro culture system and have further described their pro-inflammatory responses following VEE infection.
DTIC
Central Nervous System; Encephalitis; Epidemiology; Immunity; Infectious Diseases; Physiological Responses; Viruses

20040050840 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy
Wiggins, Alton R.; Oct. 1998; 104 pp.; In English
Report No.(s): AD-A421192; No Copyright; Avail: CASI; A06, Hardcopy

The purpose of this study is to describe the management characteristics of anesthesia care delivery by Certified Registered Nurse Anesthetists (CRNAs) and anesthesiologists in small, medium, large, teaching, and nonteaching hospitals in the USA Navy. The study describes the relationship between the management characteristics and practice patterns of anesthesia providers in U. S. Naval Hospitals in the Continental USA (CONUS) and Outside Continental USA (OCONUS). No data has been found in the literature to describe the management characteristics and practice patterns of Navy CRNAs and anesthesiologists in the delivery of anesthesia. The research instrument was a 45-item questionnaire developed by the author, along with two other Student Registered Nurse Anesthetists researchers, mailed to the Chief CRNAs at 20 CONUS and 9 OCONUS naval hospitals where anesthesia services are currently provided. The questionnaire provided data on demographics, practice patterns, provider responsibilities, and management and personnel characteristics of anesthesia care delivery in U. S. Naval Hospitals. Descriptive data from 23 of 29 Departments of Anesthesia (79%) were analyzed and data reported on management and practice characteristics of anesthesia care by military CRNAs and anesthesiologists Navy wide. The data

describes the ratio of Navy anesthesiologists to CRNAs, practice patterns of Navy CRNAs, productivity measurement, daily and monthly work schedules, and anesthesia staffing call assignments of Navy CRNAs and anesthesiologists.
DTIC
Anesthesia; Education; Health; Hospitals; Navy

20040050841 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Differences in the Onset and Severity of Symptoms of Malignant Hyperthermia With Different Inhalational Anesthetics
Solberg, Alison T.; Oct. 1999; 87 pp.; In English
Report No.(s): AD-A421193; No Copyright; Avail: CASI; A05, Hardcopy

Malignant hyperthermia (MH) is an uncommon inherited disorder of skeletal muscle in which commonly used anesthetics can trigger sustained skeletal muscle hypermetabolism in patients who may have had no symptoms previously. The onset and severity of clinical symptoms of MH are variable. Non-clinical studies and case reports have identified differences in the onset and severity of symptoms with the commonly used volatile anesthetics. The purpose of this study was to identify if there is a significant difference in the onset and severity of signs and symptoms of malignant hyperthermia in those MH-susceptible patients who received the different volatile anesthetics. A comparative descriptive research design was used. A retrospective review of the database at the (USUHS) MH muscle biopsy diagnostic center was done. The data collected was used to determine if there was a difference in the onset and severity of signs and symptoms of MH episodes with halothane compared to MH episodes of four other volatile anesthetics. For each of these groups, the following variables were assessed: highest temperature, highest end-tidal carbon dioxide, time from beginning of anesthetic until onset of first MH symptom, time of onset of anesthesia until initial treatment for MH, and the incidence of masseter spasm. Based on results of this study, there was no significant difference among the groups. As much of the pediatric data was excluded, the results may have been skewed. Further studies examining these differences between volatile anesthetics would be extremely valuable in understanding the pathophysiology of malignant hyperthermia.
DTIC
Anesthetics; Hyperthermia; Signs and Symptoms

20040050842 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Ethical Issues of Air Force Nurses Practitioners in Clinical Practice
Gilchrist, Carol L.; May 2000; 59 pp.; In English
Report No.(s): AD-A421194; No Copyright; Avail: CASI; A04, Hardcopy

What are the ethical issues or situations Air Force Nurse Practitioners (AFNPs) experience in clinical practice? Which moral or ethical principles are reflected? Little has been written about the ethical issues faced by AFNPs in clinical practice. The description and exploration of these issues was accomplished in this study through the use of qualitative research methodology. Seven active duty AFNPs provided narrative accounts of ethical issues and situations encountered in their clinical practice. The individual narratives were analyzed and findings were presented using four basic principles of biomedical ethics: respect for autonomy, nonmaleficence, beneficence, and justice. Implications of this study illustrate the need for some type of ethics education in advanced practice nursing curricula. Further implications for use in clinical practice include time management, resource utilization, template creation, and training. More research is needed to determine if the experiences of AFNPs are universal to the profession of advanced practice nursing. Patient and healthcare provider satisfaction, and retention of personnel in military service may all be impacted by further research in ethical issues in clinical practice.
DTIC
Armed Forces (United States); Clinical Medicine; Education; Medical Personnel; Personnel

20040050843 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs)
Tomon, John J.; Jun. 18, 2003; 62 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421195; No Copyright; Avail: CASI; A04, Hardcopy

The determination of mean glandular dose (MGD) to the breast is an essential aspect of mammography equipment evaluations and exposure controls. The American College of Radiology (ACR) Quality Control Manual outlines the procedure for MGD determination in screen-film mammography based upon conversions of entrance skin exposures (ESEs) measured with an ionization chamber (IC). The use of digital mammography has increased because of the need for improved object

resolution and tissue contrast. Digital mammography incorporates a different image receptor (solid-state detector), which may lead to different MGDs compared to screen-film mammography. Therefore, evaluating and verifying the applicability of the ACRs MGD methodology to digital mammography is essential in determining the carcinogenic risk associated with digital mammograms. This research measured the applicability and accuracy of the ACRs MGD methodology to digital mammography. MGD measurements were determined using the light output from TLD-100H (LiF:MCP) TLDs and conversions of ESEs measured with an IC (ACR methodology). The statistical evaluation of the MGD data revealed the ACR s MGD methodology is not applicable to the imaging modality of digital mammography (all P values <0. 05). The comparison of the TLD and IC MGD calculations resulted in a measured MGD differential no greater than 0.12 mGy. Additionally, a more rigorous method of MGD was calculated by averaging the thermoluminescent (TL) absorbed dose at various depths throughout a breast phantom. This more through method of calculating MGD resulted in a MGD of 1.34 mGy 0.07 +/- mGy as compared to the ACR s methodology MGD of 1. 34 mGy +/- 0.001 mGy.
DTIC
Copper Fluorides; Doped Crystals; Dosimeters; Lithium Fluorides; Mammary Glands; Thermoluminescence

20040050845 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
A Double-Blind Randomized Placebo Controlled Trial of Magnesium Oxide for Alleviation of Chronic Low Back Pain
Schrader, Jeffrey L.; Jan. 1999; 75 pp.; In English
Report No.(s): AD-A421199; No Copyright; Avail: CASI; A04, Hardcopy

This double-blind randomized placebo controlled trial used a pre-test/post-test control group design. Sixty adults patients complaining of chronic low back pain (greater than six months) were recruited from a free standing major metropolitan pain center. Half of the patients received an oral 800mg magnesium oxide supplement and half received an oral placebo every day for a two-month trial period. Laboratory analysis of serum total magnesium, serum ionized magnesium, and sublingual (tissue) magnesium levels (Exatest, ICD Inc.) were performed before and after the trial. All patients were asked to assess their pain and various quality of life indicators using a 10 point Likert Scale before and after the trial. In the magnesium treated group starting pain scores reported a mean of 6.6 (SD+/-2.0) and post study pain scores were reported with a mean of 6.4 (SD+/-1.7). There were no significant changes in pre or post study magnesium levels in the treatment group. Total serum and serum ionized magnesium levels correlated (p<.001), but no significant correlation (p=.828) was noted between total serum and sublingual (tissue) magnesium levels. The average diastolic blood pressure in the magnesium treated group decreased significantly (5.9mmHg; p =.040). Surprisingly, the total serum magnesium levels increased by 0.05mM/L in the placebo group. Although these data do not support the hypothesis that oral magnesium oxide supplementation can reduce chronic pain, compliance was not confirmed, so replication of this study with a more controlled patient population may be beneficial. As magnesium levels did not rise significantly, a higher dose or a more absorbable magnesium chelate might be more effective. A magnesium wasting effect of orally administered magnesium oxide may also need to be considered.
DTIC
Magnesium Oxides; Pain; Spine

20040050849 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat
Stelflug, Bradley W.; Oct. 1998; 97 pp.; In English
Report No.(s): AD-A421206; No Copyright; Avail: CASI; A05, Hardcopy

Local anesthetics are used daily by anesthesia providers to perform spinal, epidural, and peripheral nerve blocks. Large volumes of local anesthetic are used for peripheral nerve blocks especially if more than one block is performed on a patient. These local anesthetics can have side effects such as nerve compression, nerve damage, or even toxic plasma levels that can lead to seizures. Using less volumes and concentrations of these anesthetics would reduce the chances of these complications. To discover the minimum amount of local anesthetic needed intraneurally, an in vivo model of the rat sciatic nerve was used. In the anesthetized rat, the sciatic nerve was surgically exposed and then injected in the subperineural space with either 10 or 20 ml of 2% lidocaine or a control solution. The proximal end of the nerve (at the greater sciatic notch) was electrically stimulated and the tibial division of the nerve (near the ankle) was used for recording the compound action potential (CAP). The averaged CAPs were recorded periodically for up to an hour. The data displayed a trend of 20ml of 2% lidocaine blocking the CAPs and that 10ml of 2% lidocaine did not consistently block the CAPs. The data suggests that 20ml is the minimum dose of 2% lidocaine needed intraneurally to block evoked potentials in muscle and rapidly conducting sensory signals, including fast pain.
DTIC
Anesthesia; Bioelectric Potential; Blocking; Dosage; Evoked Response (Psychophysiology); Nerves; Rats; Sciatic Region

20040050850 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3

Lea IV, Paul M.; May 25, 2000; 134 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421207; No Copyright; Avail: CASI; A07, Hardcopy

We are the first to report involvement of group II metabotropic glutamate receptors (mGluRs; specifically mGluR3) in modulation of epileptiform activity and long-term potentiation (LTP) in the hippocampal dentate gyrus. By stimulation and/or inhibition of group II mGluRs in rat hippocampal slices, we discovered that: (1) Nacetylaspartylglutamate (NAAG; 50 and 200 M) blocked LTP of extracellular excitatory post-synaptic potentials (EPSPs) after high-frequency stimulation (100Hz; 2s) of the medial perforant path, (2) the beta-isomer of NAAG (beta-NAAG) and ethyl glutamate (100 M; group II mGluR antagonist) prevented this blockade, and (3) beta-NAAG did not affect EPSPs recorded in a paired-pulse paradigm which argues against a presynaptic effect. These data are the first to indicate competitive effects between beta-NAAG and NAAG on mGluR3 receptors. beta- NAAG s effects were characterized using cultured cells. In cerebellar granule cells, we found that: (1) beta-NAAG did not affect inositol phosphate production stimulated by mGluR group I agonists glutamate, L-CCGI, and quisqualate, (2) beta-NAAG reversed decreases in forskolin-stimulated cAMP caused by the mGluR group II agonist DCG-IV, and (3) beta-NAAG did not reverse decreases in forskolin-stimulated cAMP caused by the mGluR group III agonist L-AP4. These results ruled out group I and III mGluRs as effectors of beta-NAAG. We used cells stably transfected with mGluR2 or mGluR3 to determine that beta-NAAG blocked forskolinstimulated cAMP responses to glutamate, NAAG, the nonspecific group I, II agonist trans-ACPD, and the group II agonist DCG-IV via mGluR3, but not mGluR2. We conclude that beta-NAAG is a specific antagonist of mGluR3.

DTIC

Ethyl Compounds; Glutamates; Glutamine; Modulation; Radicals; Rats; Receptors (Physiology)

20040050851 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

The Effect of Endotracheal Inflation Technique on Endotracheal Cuff Pressure

Evans, Mark L.; Oct. 1999; 62 pp.; In English

Report No.(s): AD-A421208; No Copyright; Avail: CASI; A04, Hardcopy

Many surgical procedures require general anesthesia in which endotracheal intubation and mechanical ventilation is utilized in order to maintain adequate patient oxygenation. Endotracheal intubation, helps assure delivery of the adequate ventilation and prevention of aspiration of stomach contents into the lungs. In this study endotracheal cuff pressures were measured and correlated to currently utilized cuff inflation techniques. Data was analyzed using descriptive statistics. In 46% of the cases the cuffs were inflated using the pilot balloon palpation technique, 28% were inflated using the set volume technique, and 26% using the minimum occlusive pressure technique. Regardless of the technique used, none of the cuff pressures collected were found to be in the acceptable range of 18 to 25 mmHg. Thirteen percent of cuff pressures were below the minimum value required to prevent aspiration, and 87% of the sample were inflated above the maximum acceptable pressure, risking tracheal ischemia. These results suggest that the currently used techniques expose patients to excessive endotracheal cuff pressures.

DTIC

Anesthesia; Cuffs; Trachea

20040050853 Uniformed Services Univ. of the Health Sciences, Bethesda, MD

The Effect of Prostate Cancer Support Groups on Uncertainty

Sall, James L.; May 2000; 63 pp.; In English

Report No.(s): AD-A421210; No Copyright; Avail: CASI; A04, Hardcopy

The purpose of this study was to compare the amount of uncertainty experienced by men with prostate cancer who attended a support group and those who did not. The theoretical framework utilized Mishel's Uncertainty in Illness Model. The model has been extensively tested in a variety of chronic illnesses including malignant neoplasms. Uncertainty was measured using the Mishel Uncertainty in Illness Scale Community form (MUIS-C), a tool specifically designed for use in an outpatient setting. To measure uncertainty in prostate cancer patients attending a support group, the study surveyed a convenience sample of men from a prostate cancer support group sponsored by a large hospital in the Northeastern USA. To compose a control group the survey was also mailed to a random sample of men with prostate cancer provided by the Center for Prostate Disease Research. Eighty-nine surveys were completed: 20 men were members of a support group and 69 who

were not. The data revealed that uncertainty was similar for the two groups, as their scores were nearly identical.
DTIC
Cancer; Prostate Gland; Stress (Physiology)

20040050854 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Effects of Stress and Relaxation on Time Perception
Chavez, Bonnie R.; Jan. 2003; 215 pp.; In English
Report No.(s): AD-A421211; No Copyright; Avail: CASI; A10, Hardcopy

Changes in time perception during and following experiences of stress and relaxation are commonly reported, but little is known about the direction and nature of any time perception changes. In this experimental study, men and women ages 18 to 79 were randomly assigned to one of three conditions: stress (n = 39) - speech preparation and presentation, relaxation (n = 38) - a progressive muscle relaxation exercise, or control (n = 39) - listening to a biography on tape. Multiple measures of time production, time estimation, perceived rate, and attention to time domains (past, present, and future) were made before and after the experimental phase. Retrospective time estimates were made after the experimental phase. Self report, physiological, and biochemical measures of stress were used to evaluate response to the experimental conditions, and results were consistent with increased stress in the stress condition and increased relaxation in the relaxation condition. Measures of duration judgment were relatively consistent within individuals with larger variance from person to person. Some of the individual variance was associated with gender and age with women having generally larger duration judgment ratios (subjective/ objective time) than did men ($t(110)=2.91$, $p<.01$) and age was significantly correlated with duration judgment ratio. Time was reported to pass slower than usual during relaxation ($t(34) = 5.37$, $p<.01$), but time spent relaxed was remembered as significantly shorter than time spent in the control activity ($F(2,108) = 9.88$, $p <.01$). Stress led to increases in subjective to objective time ratio ($t(37) = 2.34$, $p <.05$), and time following a period of stress was reported to pass quickly. Attention to the present was related to lower reported distress, whereas attention to the past was positively correlated with self-reported distress. These data
DTIC
Perception; Relaxation (Physiology); Stress (Psychology); Stress Relaxation; Time

20040050855 National Academy of Sciences - National Research Council, Washington, DC
Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam
Jan. 1993; 52 pp.; In English
Report No.(s): AD-A421213; No Copyright; Avail: CASI; A04, Hardcopy

No abstract available
Exposure; Health; Herbicides; Personnel; Vietnam

20040050856 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Nurse Practitioners' Experience With Herbal Therapy
Garner, Virginia A.; May 2000; 78 pp.; In English
Report No.(s): AD-A421214; No Copyright; Avail: CASI; A05, Hardcopy

Use of herbal therapy has dramatically risen in the last decade. Advertisement and access to these supplements has also grown. Patient use, benefits, and potential adverse effects of herbal therapy have been well documented in the literature, but provider response to this phenomenon has not been well documented. The purpose of this study was to explore and describe nurse practitioners experience with herbal therapy. Grounded theory methodology, a qualitative research approach, guided the research process. A purposeful sample of 8 Air Force nurse practitioners was interviewed. Data collection and analysis occurred simultaneously using coding and categorization until saturation had been established and a core variable emerged. Results identified nine theme categories related to knowledge, safety, validity and effectiveness, responsibility, time, cost, complementary vs. Western medicine, patient/provider relationship, and prescribing vs. recommending. Knowledge of herbal therapy and the acquisition thereof emerged as the core variable in this study. Knowledge influenced how much herbal therapy was incorporated into practice, which contributed to overall experience. As experience expanded, this further contributed to the body of knowledge on herbal therapy. As more and more patients use herbs to attain or maintain a state of well-being, this study highlights the need for nurse practitioners to remain current and focus on knowledge acquisition regarding herbal therapy.
DTIC
Medical Services; Military Operations; Therapy

20040050857 Air Force Hospital, Lackland AFB, TX

A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century

Stevens, Douglas E.; Jun. 3, 2003; 233 pp.; In English; Original contains color illustrations

Report No.(s): AD-A421219; HCA-33-03; No Copyright; Avail: CASI; A11, Hardcopy

Senior Air Force Medical Service Corps officers serving in the rank of Colonel and Lieutenant Colonel were chosen to identify executive skills for leaders in the Military Healthcare System. For this study, the investigators conducted two iterations of the Delphi technique separated by an expert panel content analysis. In round one, the cohort identified 303 competencies. After expert content analysis, these competencies were refined into 51 unique competencies categorized into 12 logical domains. The domains were leadership, expeditionary operations, resource management, technology and information, business management, health plan management, human resource management, contracting, strategic management, clinical practice management, logistics and infrastructure, and regulatory and compliance. Additionally, from the responses provided in round one, 187 skills, knowledge, and/or ability (SKA) statements were developed. During round two, respondents rated each SKA statement for importance and evaluated the junior executives within their facilities in preparedness for these SKAs. The two highest rated SKAs were the ability to demonstrate accountability, integrity, and officership followed by interpersonal, communication, and listening skills . Of special note, six of the highest preparedness ratings were among the 15 most important SKAs. Gender, rank, and current position differences were also examined. Gender differences, primarily in the leadership domain reflected the greatest disparity within the cohort. Although gender difference presented the largest group of statistically significant findings ($p<.05$), these results accounted for only 7.7 percent of the total SKAs. By far, the most compelling finding was the mean difference analysis conducted to examine differences between SKA average importance and junior executive preparedness ratings. Statistically

DTIC

Clinical Medicine; Delphi Method (Forecasting); Leadership; Medical Services; Operating Systems (Computers); Resources Management

52
AEROSPACE MEDICINE

Includes the biological and physiological effects of atmospheric and space flight (weightlessness, space radiation, acceleration, and altitude stress) on the human being; and the prevention of adverse effects on those environments. For psychological and behavioral effects of aerospace environments, see *53 Behavioral Sciences*. For the effects of space on animals and plants see *51 Life Sciences*.

20040046857 Institute of Space Medico-Engineering, Beijing, China

Space Medicine and Medical Engineering, Volume 16, No. 1

Wei, Jin-He, Editor; Su, Shuang-Ning, Editor; Jiang, Shi-Zhong, Editor; Wang, Xian-Min, Editor; Liu, Xin-Min, Editor; Su, Hong-Yu, Editor; Bai, Jing, Editor; Sun, Xi-Qing, Editor; Xiao, Zhi-Jun, Editor; Liu, Yong, Editor, et al.; February 2003; ISSN 1002-0837; 84 pp.; In English; In Chinese; Original contains black and white illustrations

Report No.(s): CN-11-2774/R; Copyright; Avail: Other Sources

This issue presents original research papers and brief reports. Subjects discussed in the original research papers include: gravitational effects, human body dynamic responses to supine landing impact, human centrifuges, visual attention, microwave irradiation, exercise, heat transfer and skin, human body measurements, and medical equipment. The brief reports discuss: visual search and selection of a pull-down menu, magnetic fields and brain injury, and ANP cDNA transfection cells and hypertension.

CASI

Aerospace Medicine; Chinese Space Program

20040046858 Institute of Aviation Medicine, Beijing, China

+Gz Protection of a New Bladder Anti-G System

Gen, Xi-Chen; Yan, Gui-Ding; Jin, Zhao; Xu, Yan; Wang, Hong; Li, Li-Hua; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 1-4; In English; See also 20040046857; Copyright; Avail: Other Sources

A new bladder anti-G system was developed to get better + Gz protection. The purpose of this study was to assess the + Gz protection afforded by it on the centrifuge. Six male subjects using the new bladder anti-G system were exposed to 10 - 15 s ladder-shaped + Gz profiles without anti-G straining maneuver(AGSM), then exposed to + 5 - 9 Gz simulated aerial combat maneuver (SACM) with leg straining. The + Gz protection and the + Gz-time tolerance were obtained. The anti-G

effectiveness of the advanced bladder system was 5.33 plus or minus 0.26 G. All subjects passed the + 5 - 9 Gz SACM , but the effort and fatigue were lower. The + Gz protection afforded by this system is high. The suggested scheme of the new bladder anti-G system is feasible.
Author
Antigravity; Bladder; Aerospace Medicine; Suits; Human Centrifuges

20040046859 Institute of Space Medico-Engineering, Beijing, China
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture
Guo, Xiao-chao; Liu, Bao-shan; Xiao, Hui; Wang, Zhi-jie; Li, Rong; Guo, Hui; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 48-54; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to provide the latest anthropometric data of Chinese male pilots on a large scale. 94 linear dimensions of human body measurements were defined, of which there are 42 fundamental items and 52 recommended items. The computer databanks were programmed, in which the subprograms were preset for data checking such as extreme value examination, logical judgement for data relationship, and measuring-remeasuring difference test. All workers were well trained before pilot measurements. 1739 male pilots from China Air Force was measured for the 42 fundamental items, and of which 904 pilots were measured for the 52 recommended items. Mean, standard deviation, the maximum value, the minimal value, and the 5th, 50th, 95th percentile data of all the 94 items were given. The quality of the data was stable and reliable. All data of the 94 linear dimensions of human body measurements were valid and reliable with high precision.
Derived from text
China; Human Body; Males; Aircraft Pilots; Linearity; Body Measurement (Biology)

20040046861 Fourth Military Medical Univ., Xi'an, China
Development and Application of Self-powered Short Arm Human Centrifuge
Sun, Xi-Qing; Yao, Yong-Jie; Yang, Chang-Bin; Feng, Dai-Ya; Wu, Yan-Hong; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 10-13; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to present the development and application of a self-powered short arm human centrifuge. Self-powered short arm human centrifuge consisted of human power, adjustable resistance trig, short arm and supporting construction parts. It was driven by human power. The short arm turned around the supporting part so artificial gravity is produced. The physical load can be adjusted by the adjustable resistance part. G-level depends on the rotative velocity of the central shaft. Nine healthy male volunteers received self-powered short arm human centrifuge training for 5 min per day with rotative velocity of 30 to approximately 34 r (raised dot) per minute for 7 d. Cardiac pumping function was measured before and after training. Heart rate (HR) decreased significantly while left ventricular ejection time (LVET) increased significantly after 3 d training, and HR and LVET changed further after 7 d training. Stroke volume increased significantly only after 7 d training. Self-powered short arm human centrifuge combines artificial gravity and exercise and included other advantages of safety and economy of construction. Cardiac pumping function could be improved by 7 d training. It may be used for anti-G physiological training or as a countermeasure to counteract the effect of microgravity.
Author
Artificial Gravity; Human Centrifuges; Cardiovascular System; Aerospace Medicine; Manual Control

20040046862 Institute of Aviation Medicine, Beijing, China
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy
Jin, Yan-Bin; Yang, Chang-Lin; Yu, Hong; Cheng, Jie; Yi, Chang-Rong; Zhan, Hao; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 28-31; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to study the effects of nutritional intervention on changes of monoamines in rats brain, certain amino acids in rats serum and maze behaviors caused by high + Gy exposure. The mice were arranged into control group (Group A), + Gy group (Group B) and + Gy nutritional intervention group (group C). Group A was not exposed to + Gy. Both Group B and group C were exposed to + 10 Gy for 8 min. Three hours before + Gy exposure distilled water was given to mice in group B by gavage. The day before exposure pyridoxal fortified water was given and 3 h before exposure mixed amino acids solution were given by gavage to group C. Maze test scores were recorded for all groups. After the maze test was completed, blood was collected through the eyes for serum amino acids and brain tissue was collected by decollation for mono-amines and gamma-glutamyl transferase (GGT) activity determinations. After + Gy exposure maze test scores and

brain NE concentrations decreased and abnormal behaviors were found. While other monoamine transmitters increased significantly. In group C maze behaviors improved and biochemical changes induced by + Gy exposure alleviated. High + Gy exposure can induce changes of neural transmitters coming from nutritional metabolites in central nervous system. As a result, brain functions are affected. Nutritional intervention can alleviate this negative effect to some extent.
Derived from text
Biochemistry; Brain; Nutrition; Exposure; Physiological Effects; Mice

20040046863 Huazhong Univ. of Science and Technology, Wuhan, China
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise
Xu, Guo-Dong; Liu, Fang; Gong, Hui; Ge, Xin-Fa; Luo, Qing-Ming; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 41-43; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to study the relationship between blood lactate and blood oxygenation in human skeletal muscle. Using a portable tissue oximeter based on Near-Infrared Spectroscopy (NIRS), concentration of HbO2, blood lactate and blood volume were measured non-invasively and continuously when the subjects were doing incremental exercise on a bicycle ergometer. As the intensity of exercise was increased, blood lactate concentration, blood volume in tissue increased, while concentration of HbO2 decreased. It is possible to assess the fatigue state with tissue oximeter by monitoring intensity of exercise non-invasively and dynamically. By studying their correlations, a novel approach for measuring blood lactate non-invasively and assessing sports ability could be provided.
Derived from text
Blood Volume; Lactates; Musculoskeletal System; Oxygenation; Physical Exercise; Aerospace Medicine

20040046864 Institute of Space Medico-Engineering, Beijing, China
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position
Liu, Bing-Kun; Wang, Xian-Min; Wang, Yu-Ian; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 5-9; In English; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to study the characteristics of human body dynamic responses to landing impact. Five healthy young men were exposed to 4 to approximately 10 G for 50 to approximately 80 ms half-sine acceleration pulse at 20 degree supine angle and 10 G for 50 ms impact at 30 degrees to approximately 60 degree supine angles. The acceleration curves on the dropping platform of the impact tower, the seat, the human head, shoulder, chest and ilium, as well as ECG of the subjects were recorded. The peaks of acceleration at the subject head, shoulder, chest, and ilium along chest- back direction rose with the increase of the impact level. The overshoots of acceleration at the subject head along head-ilium direction and chest-back direction were 93% and 102% respectively for 10 G at 20 degree supine angle. With increase of supine angle, acceleration response at the subject along chest-back direction decreased. Acceleration response at the subject head along head-ilium direction was minimum at 40 degree supine angle. Transfer function of the human body to landing impact demonstrated that human body had a series of resonance frequencies which were 25 Hz, 34 Hz, 39 Hz, 43 Hz, 50 Hz, 64 Hz, and 70 Hz respectively.
Derived from text
Dynamic Response; Human Body; Landing Loads; Supine Position; Impact Acceleration; Aerospace Medicine

20040046865 Academia Sinica, Beijing, China
Differential Visual Attention Scales Directed by Location Versus Semantic Cue
Gao, Wen-Bin; Wei, Jing-Han; Peng, Xiao-Hu; Luo, Yue-Jia; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 14-18; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to compare the cortical mechanisms associated with visual spatial attention directed by location cues and Chinese character cues. Eleven healthy adults (mean age = 19) with normal vision served as the subjects. In experiment I, the cue was a circle with black solid line. There were three cue sizes: small, medium and large. In experiment II, three black concentric circles were presented as background, their diameters were the same as the three cues used in experiment I. The cue was one of three Chinese characters small ,medium or large respectively. The task of the subjects was to discriminate the target's orientation. RT in experiment II was longer with short ISI. The anterosuperior N(sub 1), amplitude elicited by the cue in experiment II was larger than that in experiment I. The inferoposterior P(sub 1), latency in experiment II was longer than that in experiment I. Comparing the target evoked ERP, the inferoposterior P(sub 1) and N(sub 1), latency of experiment II was longer than that in experiment I, the inferoposterior P(sub 2) amplitude in experiment II was larger than that in experiment I. The processing of Chinese cue takes place at higher level functional brain regions compared to processing

of location cue. The later requires more resource in the earlier stage of cue process and less in the subsequent stage of the task. Derived from text

Visual Signals; Semantics; Aerospace Medicine; Position (Location); Attention

20040046866 Fourth Military Medical Univ., Xi'an, China

Effects of +Gz Exposure Time on Memory and Behavior in Rats

Wei, Ying-Bo; Sun, Xi-Qing; Cao, Xin-Sheng; Yao, Yong-Jie; Feng, Dai-Ya; Yang, Chang-Bin; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 19-23; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to explore the effect of + Gz exposure time on memory and behavior in rats. Twenty-four male SD rats were randomly divided into control group(A), + 10 Gz per 3 min group(B) and + 10 Gz per 5 min group(C). Rats in group A and B were exposed to + 10 Gz for 3 min or 5 min respectively. Changes of memory and behavior in rats were observed after + Gz exposure. As compared with control, percentage of right reflex decreased significantly and reaction time lengthened significantly immediately, 1 d ,2 d , 4 d and 6 d after + 10 Gz per 5 min exposure (P less than 0.01); reaction time lengthened significantly immediately and 2 d after + 10 Gz per 3 min exposure (P less than 0.01). As compared with + 10 Gz per 3 min, percentage of right reflex decreased significantly and reaction time lengthened significantly at 1 d ,2 d ,4 d and 6 d after + 10 Gz per 5 min exposure (P less than 0.01). As compared with control and + 10 Gz per 3 min, time stayed in center grille lengthened significantly immediately after + 10 Gz per 5 min exposure (P less than 0.01); balancing function decreased significantly immediately and 2 d after + 10 Gz per 5 min exposure (P less than 0.01). It is suggested that + 10 Gz per 3 min exposure may induce a provisional disturbance in memory function and a change in behavior in rats, and + 10 Gz per 5 min exposure may induce a sustained disturbance in memory function and an obvious change in behavior in rats. Author

Exposure; Memory; Aerospace Medicine; Gravitational Effects; Rats; Reaction Time; Acceleration (Physics)

20040046867 Institute of Aviation Medicine, Beijing, China

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage

Han, Xue-Ping; Wang, Qiong; Fu, Li-Shan; Chen, Juan; Shi, Qiang; Yan, Ru-Quan; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 24-27; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to compare cardiovascular function of subjects exposed to positive pressure breathing (PPB) while wearing G-suits with different bladder coverage. Method 6 male healthy subjects (18 to approximately 20 years) wearing three kinds of G-suit with bladder coverage of 45%, 65% and 90%, respectively, were exposed to PPB with counterpressures of 30, 50 or 70 mmHg for up to 3 min continuously. G-suit bladder pressure value was three times as high as that of PPB counterpressure. Cardiovascular function was observed every minute. The interval between PPBs was 10 min. The equipment consists of G-suit, jerkin, helmet and mask. All subjects completed the experiment successfully. Mean arterial pressure (MAP) elevated significantly, while stroke volume had no striking change, as compared with control group when wearing G-suit with 65% or 90% bladder coverage G-suit. During PPB for 3 min. cardiovascular function didn't change significantly. The mean value of MAP was proportional to the level of PPB. The greater G-suit bladder coverage, the less cardiovascular function effect when PPB was conducted simultaneously.

Derived from text

Cardiovascular System; Pressure Breathing; Pressure Suits; Bladder; Aerospace Medicine; Microgravity

20040046868 Institute of Hygiene and Environmental Medicine, Tianjin, China

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress

Ren, Hui-Rong; Qian, Ling-Jia; Gong, Jing-Bo; Wang, Xin-Xing; Ren, Chong-Yu; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 32-35; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to investigate the effect of constraining stress on biological characters and function of mitochondrial membrane in rat heart and to explore the possible mitochondrial membrane mechanism underlying stress-induced heart injury. Stress animal model was established. After constrained for different times, all rats were killed and several indexes were examined. Constraining stress can induce mitochondrial permeability transition, decrease of mitochondrial membrane fluidity, increase of the production of membrane lipid peroxidation and injury of mitochondrial respiratory function which is in time-dependent manner. Mitochondrial membrane impairment and its effects are the important mechanism of stress-induced heart injury.

Author

Heart; Injuries; Rats; Stress (Biology); Mitochondria; Cell Membranes (Biology)

20040046869 Institute of Space Medico-Engineering, Beijing, China

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane

Zhao, Ya-Li; Ma, Hong-Bo; Song, Jin-Ping; Yang, Yu-Hua; Pu, Jing-Sui; Zheng, Jian-Quan; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 36-40; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to study the effect of microwave irradiation on hippocampus cell. Changes of ATPase activity and voltage dependent ion channel of hippocampus cell membrane were observed in mice exposed to 2 450 MHz microwave irradiation of 10 milliwatts per square centimeters from a physical therapy machine. Histochemical method and patch clamp method were used to determine the activity of Na(+), K(+) -ATPase, Ca(2+), Mg(2+) -ATPase and voltage dependent Na(+), K(+), Ca(2+) channels respectively. 1) Na(+), K(+) -ATPase activity of microwave irradiated mice showed no significant change as compared with the control, but the activity of Ca(2+), Mg(2+) -ATPase decreased significantly (P less than 0.05); 2) In microwave irradiated mice, Na(+), K(+), Ca(2+) current inducement rate in hippocampus neuron decreased significantly, the membrane voltage of Na(+) current peak shifted to depolarization, and the attenuation rate of Na(+) current and current A inducement rate decreased significantly as compared with control mice. Irradiation of 2 450 MHz microwave at a doze of 10 milliwatts per square centimeter was not fatal to mice hippocampus cell. But Ca(2+), Mg(2+) -ATPase activity of hippocampal cell membrane and voltage dependent Na(+), K(+), Ca(2+) ion channel of hippocampal nervous were affected which would affect study and memory.

Derived from text

Hippocampus; Irradiation; Microwaves; Rats; Cell Membranes (Biology); Electric Potential; Ion Channels (Biology)

20040046870 Institute of Space Medico-Engineering, Beijing, China

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water

Jiang, Shi-chen; Li, He-jie; Ma, Ning; Zhang, Xue-xue; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 44-47; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to analyze heat transfer process in skin tissues subjected to hot water and thus to predict the extent of scald. Based on Pennes' Bio-heat Equation, a model for characterizing the damage process in tissues was presented and used for its analysis. Temperature distribution in the tissues during the process and the time of beginning of scald were numerically obtained. It was found that the effects of different initial temperature distribution, convection coefficients between the hot water and the tissue surfaces, and the temperature of the hot water are significant. The transient heat transfer behavior in multi-layer tissues subjected to hot water can be predicted by the present model. It is useful in the clinical diagnosis and therapy for the scald caused by hot water.

Derived from text

Heat Transfer; Mathematical Models; Tissues (Biology); Skin (Anatomy); Aerospace Medicine; Water Temperature; Hot Surfaces

20040046871 Tsinghua Univ., Bejing, China

Development of Data Acquisition Card in Exercise-ECG Detection System

Sun, Yang; Shen, Yong-lin; Xie, Hong-tao; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 64-67; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to develop a data acquisition card in exercise-ECG detection system that can gather multi-channel exercise-ECG signals simultaneously and precisely. 1) In hardware, the card was based on 196 KC single-chip microprocessor which can gather signals, process data and control circuit; 2) In software, single-chip microprocessor completed the following three main tasks: the A/D conversion, signal processing and communication with computer. The main computed receives the data and performs real time data processing. The data acquisition card in exercise-ECG detection system cooperates with the main CPU. In order to release the main CPU, the card realizes the data pre-processing and makes reasonable uses of the hardware resource. The data acquisition card could meet the needs of clinical detection of exercise-ECG.

Author

Data Acquisition; Detection; Electrocardiography; Physical Exercise; Punched Cards; Aerospace Medicine; Chips (Electronics)

20040046872 Sichuan Univ., Chengdu, China

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique

Su, Bao-hui; Ran, Jun-guo; Chen, Zhi-qing; Space Medicine and Medical Engineering, Volume 16, No. 1; February 2003, pp. 68-71; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to improve the bioactivity of hydroxyl-poly-calcium sodium phosphate appatite (HPPA) by surface modification using cold plasma technique. Surface modification of HPPA was done with cold plasma technology, structure change and the best technological parameters of HPPA were analysed and its bioactivity was determined by protein absorption and osteoblast culture in vitro. The best technological parameters of HPPA are: power 370 W; flow capacity NH3:200 ml/min N2: 100 ml/min; time 60 min. The - NH2,-OH were led into materials. The method of protein absorption and osteoblast culture in vitro shows: modified HPPA can promote osteoblast growing and increase the activity of AKP. After modification, the -NH2,-OH were led into HPPA. Bioactivity of the material was increased.

Derived from text

Cold Plasmas; Sodium Compounds; Calcium Phosphates; Activity (Biology); Polymers; Hydroxyl Compounds

20040046875 Institute of Space Medico-Engineering, Beijing, China

A Simulation Study on Cardiac Assist Device: Hemopump

Li, xiong; Bai, Jing; He, Ping; Space Medicine and Medical Engineering, Vol. 16, No. 1; February 2003, pp. 55-59; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to study the interaction between HP31 Hemopump system and the cardiovascular system. A dynamic model for a HP31 Hemopump system was developed basing on theoretical analysis and experimental data. By incorporating the Hemopump model in a previously established model for the canine circulatory system, the effects of the pump on various hemodynamic variables of the circulatory system were investigated and the benefit of the pump to a failing heart was demonstrated. In addition, different mechanisms of the Hemopump and IABP that relieve the workload of left ventricle were compared. Our results verified that the Hemopump assists a failing heart by increasing the oxygen supply to the heart while reducing its oxygen consumption through a reduction in the preload of left ventricle. These beneficial effects are generally enhanced when the pump's rotation speed is increased. However, when the pump rotation speed is too high, the inflow to the pump may be impaired and the pump performance will be negatively affected. Predications from the model are in good agreement with the results previously obtained in animal experiment and in vitro measurements. The model described in this paper should provide a useful tool to investigate and test various strategies for optimal control of the Hemopump.

Author

Cardiovascular System; Circulatory System; Hemodynamic Responses; Simulation; Mathematical Models; Blood Pumps

20040046876 Institute of Space Medico-Engineering, Beijing, China

Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System

Yu, Tian-hua; Wang, Hong-wu; Zhou, Yi-xin; Liu, Jing; Feng, Hua-song; Lu, Hai-ying; Space Medicine and Medical Engineering, Vol. 16, No. 1; February 2003, pp. 60-63; In Chinese; See also 20040046857; Copyright; Avail: Other Sources

The objective of this research is to test the working performance of the Endocare Cryoprobe System and to evaluate its advantages and shortcomings for clinical application in targeted tumor treatment. The cryoprobe was placed into air, distilled water, and rabbit tissues to observe its freezing and rewarming behaviors. The transient temperatures at the exterior wall and interior of the cryoprobe were monitored. The output performance of the cryoprobe and the consumption rate of the working gases were evaluated basing on the measurements. The temperature at the cryoprobe tip inserted into tissues decreased quickly to its lowest value and kept relatively stable during freezing. The iceball grew quickly at the initial period of freezing and then slowed down. The temperature at the cryoprobe tip increased quickly when the working gas was shifted to He. In several minutes, the iceball became thawed. The consumption rate of Ar and He gases decreased with the operation of the cryoprobe. The Endocare Cryoprobe System had excellent performances in quick freezing and rewarming. However, it also has certain disadvantages, which were briefly discussed in this paper.

Derived from text

Cryogenics; Probes; Tissues (Biology); Tumors; In Vivo Methods and Tests

Includes human factors engineering, bionics, man-machine systems, life support, space suits and protective clothing. For related information see also *16 Space Transportation and Safety* and *52 Aerospace Medicine*.

20040047010 Michigan Univ., Ann Arbor, MI
LED Headlamps: Glare and Color Rendering
Sivak, M.; Schoettle, B.; Flannagan, M. J.; Nov. 2003; 34 pp.; In English
Report No.(s): PB2004-101687; UMTRI-2003-39; No Copyright; Avail: CASI; A03, Hardcopy

Because of rapid improvements in the light output of light-emitting diodes (LEDs), serious consideration is being given to using LEDs as light sources for headlamps. This study examined the potential effects of LEDs on discomfort glare for oncoming drivers and on color rendering of retroreflective traffic materials. In both cases, the effects of LED light sources were compared to the changes in these properties that occurred when the traditional tungsten-halogen light sources were replaced with high-intensity discharge (HID) light sources. Specifically, the effect on discomfort glare was estimated by comparing the chromaticities of 7 LED light sources (considered for use in headlamps) with the chromaticities of the light sources from 17 actual HID headlamps. Analogously, the effects on color rendering were estimated by comparing the chromaticities of 46 retroflective materials when illuminated by the LED light sources with the chromaticities of the same materials when illuminated by the HID light sources.
NTIS
Light Emitting Diodes; Traffic

20040047033 Michigan Univ., Ann Arbor, MI
Time-Sharing of a Visual In-Vehicle Task While Driving: Finding from the Task Occlusion Method
Tsimhoni, O.; Dec. 2003; 60 pp.; In English
Report No.(s): PB2004-103653; UMTRI-2003-13; No Copyright; Avail: CASI; A04, Hardcopy

What can the task occlusion method reveal about time-sharing of a visual invehicle task while driving. To examine this issue, 24 licensed drivers (12 under 30 years, 12 over 65 years) were instructed to plan routes to specified destinations on an electronic map while driving a simulator. Four levels of steering difficulty (parked, straight road, moderate curves, and sharp curves) were examined for two levels of task immediacy (map fixed and map rotating). Subjects also performed the task while parked with the map intermittently occluded. Six combinations of viewing times (1, 1.5, and 2 s) and occlusion times (1 and 3 s) were examined. These results can be explained in light of four key constructs: time pressure on sharp curves resulted in short and efficient glances to the display; interference of concurrent driving resulted in longer total glance times at fixed maps while driving relative to task occlusion; and postponed processing and the cost of task partitioning balanced each other to keep total glance time unchanged when viewing time and occlusion time were manipulated.
NTIS
Simulators; Occlusion

20040050365 Oregon Univ., Eugene, OR, USA
Biomechanics of Occupational Shoulder Injuries, Final Performance Report
Karduna, A.; Gracely, E.; Mar. 09, 2004; 22 pp.; In English
Report No.(s): PB2004-104285; No Copyright; Avail: CASI; A03, Hardcopy

The first aim of this proposal was to determine if low load repetitive arm motion would lead to altered scapular motion patterns, thus providing a biomechanical basis for NIOSH's recent report. Since it would have been impractical to implement this type of protocol in an actual work environment to assess muscle impairments, the second aim of This proposal was to identify an index of muscle fatigue that will explain altered motion patterns with repetitive motion. It was believed that this would provide a basis for the development of a screening tool to assess impairment, analogous to that currently being investigated for the low back.
NTIS
Biodynamics; Injuries

20040050372 National Inst. for Occupational Safety and Health, Washington, DC, USA
Ergonomic Risk Factors and Cumulative Trauma Disorders
Franzblau, A.; Nov. 11, 1997; 14 pp.; In English
Report No.(s): PB2004-104057; No Copyright; Avail: CASI; A03, Hardcopy

Numerous studies have shown a relationship between various physical stressors and upper extremity musculoskeletal disorders (UEMSDs). It is generally agreed that a dose-response relationship exists between exposure to these stressors and the prevalence or incidence rate of these disorders. Most of these epidemiology studies however, have only examined exposures in a binary classification, either present/absent or low/high. The present study was designed with the primary goal of providing more information on the shape of the dose-response curve for hand repetition with respect to specific medical outcomes
NTIS
Dosage; Epidemiology; Exposure; Musculoskeletal System

20040050780 Academy of Health Sciences (Army), Fort Sam Houston, TX
Texas Children's Bicycle Helmet Bill Analysis
Venenga, Dana G.; May 2002; 43 pp.; In English
Report No.(s): AD-A421109; HCA-34-02; No Copyright; Avail: CASI; A03, Hardcopy

Each year over 600,000 people are treated in emergency departments (ED) for bicycle-related injuries. Nationwide, over eight hundred Americans die annually from this type of injury. Children account for 450,000 of these ED visits and an average of 400-600 of bicycle accident deaths annually (Centers for Disease Control and Prevention, 2001). Head injury is the most common cause of death and serious disability in bicycle-related crashes; head injuries are involved in about 60-80 percent of the deaths, and 30 percent of the bicycle-related ED visits. Preventable deaths of children, and associated emotional and financial costs, are major problems for American society. The purpose of this Graduate Management Project was to objectively step through the entire policy making process as it applies to determining ways to mitigate traumatic brain injuries or deaths of children who are involved in bicycle accidents; and to prove my hypothesis that a Texas children's bicycle helmet law is the best alternative for mitigating the accidental death of children who received traumatic brain injuries resulting from an accident. The end goal is to improve children's bicycle riding safety through a mandated Texas helmet use policy.
DTIC
Children; Helmets

59
MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

Includes general topics and overviews related to mathematics and computer science. For specific topics in these areas see *categories 60 through 67*.

20040047016 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput
Jin, G.; Tierney, B.; 2003; 10 pp.; In English
Report No.(s): DE2003-816771; No Copyright; Avail: Department of Energy Information Bridge

Distinguishing available bandwidth and achievable throughput is essential for improving network application performance. Achievable throughput is the throughput considering a number of factors such as network protocol, host speed, network path, and TCP buffer space, whereas available bandwidth only considers the network path. Without understanding this difference, trying to improve network application performance is like the 'blind men feeling the elephant' problem. In this paper, we define and differentiate bandwidth and throughput, and discuss which part of each is achievable and which is available. Also, we introduce and discuss a new concept, Maximum Burst Size, that is crucial to obtaining good network performance. A new tool, netest, is introduced which is designed to help users to determine the available bandwidth. It provides information to achieve better throughput while fairly sharing the available bandwidth, thus reducing misuse of the network.
NTIS
Bandwidth; Networks; Protocol (Computers); Sensory Feedback

20040047029 Newcastle-upon-Tyne Univ., Newcastle
Choosing Reputable Resources in Atomistic Peer-to-Peer Environments
Pitsilis, G.; Marshall, L.; Sep. 2003; 10 pp.; In English
Report No.(s): PB2004-104401; CS-TR-816; Copyright; Avail: National Technical Information Service (NTIS)

Peer-to-Peer information sharing environments have gained recognition and popularity during the recent years. In spite of the useful characteristics they provide in the ways that the participants can collaborate, the issue of quality preservation in

the shared material has not been addressed yet. The lack of appropriate mechanisms and policies to evaluate the participants has sown fears that the overall popularity of the services will be affected. The nature of atomistic p2p models, where survivability is based on the idea of self-organization into communities could be the basis of a solution to the quality problem build-up by the peers themselves. We consider that the deployment of an assessment scheme as a consultancy service based on a localized view of reputation could help the associated members of the peer-to-peer community in making their choices and thus in the provision of better services.
NTIS
Architecture (Computers); Computer Networks

20040047041 Helsinki Univ. of Technology, Espoo, Finland
Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum
Ylae-Jaeaeski, A.; Pernu, H.; 2003; 290 pp.; In English
Report No.(s): PB2004-102881; Copyright; Avail: National Technical Information Service (NTIS)
Contents include the following: WLAN Radio and Networks; Wireless Performance and Quality of Service; WLAN Standards and Wireless Networking Security; WLAN Based Internet Connection for Home and Small Businesses; Host Identity Payload for Mobility and Security; Comparison of IP Mobility Solutions; Network Mobility; Security in IP Mobility Solutions; An Analysis of the Fast Handovers for Mobile IPv6 Protocol; Candidate Access Router Discovery; Fast Handover Mechanisms in Mobile IPv4 Networks; Comparison between RADIUS and Diameter; Overview, details and analysis of Radius Protocol; Mobility Support in RADIUS and Diameter; Radius and High Availability & Load Balancing; Session Initiation Protocol Security Considerations; Overview of WLAN Security; SIP and Application Internetworking; Signaling in Session Initiation Protocol; SIP Call Security in an Open IP Network; Public IP-telephony Services using Wireless Data Networks; and Future of the Wireless Internet.
NTIS
Mobile Communication Systems; Protocol (Computers); Loads (Forces); Payloads

20040047059 Royal Inst. of Tech., Stockholm, Sweden
Weighted Bergman Spaces and the Integral Means Spectrum of Conformal Mappings
Hedenmalm, H.; Oct. 2003; 46 pp.; In English
Report No.(s): PB2004-102648; TRITA-MAT-2003-17; No Copyright; Avail: CASI; A03, Hardcopy
No abstract available
Mathematics; Conformal Mapping

20040047060 Rutherford Appleton Lab., Chilton
Stopping Citerion for the Conjugate Gradient Algorithm in a Finite Element Method Framework
Arioli, M.; Dec. 2003; 32 pp.; In English
Report No.(s): PB2004-102650; RAL-TR-2002-034; Copyright; Avail: National Technical Information Service (NTIS)
The Conjugate Gradient method has always been successfully used in solving the symmetric and positive definite systems obtained by the finite element approximation of self-ad joint elliptic partial differential equations. Taking into account recent results by Golub and Meurant (1997), Meurant (1999a), and Strakos and Tichy (2002) which make it possible to approximate the energy norm of the error during the conjugate gradient iterative process, we adapt the stopping criterion introduced by Arioli, Noulard and Russo (2001). Moreover, we show that the use of efficient preconditioners does not require changing the energy norm used by the stopping criterion. Finally, we present the results of several numerical tests that experimentally validate the effectiveness of our stopping criterion.
NTIS
Conjugate Gradient Method; Finite Element Method; Numerical Analysis

20040047061 Royal Inst. of Tech., Stockholm, Sweden
Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws
Ibragimov, N. H.; Kolsrud, T.; 2003; 16 pp.; In English
Report No.(s): PB2004-104404; Copyright; Avail: National Technical Information Service (NTIS)
We present a Lagrangian approach to evolution equations by considering them together with their associated equations. The approach allows one to employ Noether's theorem and derive conservation laws from symmetries of the coupled system

of evolution type equations. We apply our method to the linear and non-linear heat equations as well as to the Burgers equation and obtain new conservation laws using their symmetry Lie algebras.
NTIS
Mathematical Models; Conservation Laws; Lagrangian Function

20040047075 Brookhaven National Lab., Upton, NY, California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA, Cornell Univ., Ithaca, NY, USA
Remote Operations in a Global Accelerator Network
Peggs, S.; Satogata, T.; Agarwal, D.; Rice, D.; 2002; 10 pp.; In English
Report No.(s): DE2003-816587; No Copyright; Avail: Department of Energy Information Bridge
The introduction to this paper summarizes the history of the Global Accelerator Network (GAN) concept and the recent workshops that discussed the relationship between GAN and Remote Operations. The remote operations scenarios section brings out the organizational philosophy embodied in GAN-like and to non-GANlike scenarios. The set of major topics raised at the workshops are only partially resolved. Collaboration tools are described and discussed, followed by examples of remote accelerator control prouects around the world.
NTIS
Accelerators; Networks

20040047076 Pennsylvania State Univ., University Park, PA, USA, California Univ., Davis, CA, USA
Bipartite Graph Partitioning and Data Clustering
Zha, H.; He, X.; Ding, C.; Simon, H.; Gu, M.; 2003; 12 pp.; In English
Report No.(s): DE2003-816202; No Copyright; Avail: Department of Energy Information Bridge
Many data types arising from data mining applications can be modeled as bipartite graphs, examples include terms and documents in a text corpus, customers and purchasing items in market basket analysis and reviewers and movies in a movie recommender system. In this paper, we propose a new data clustering method based on partitioning the underlying bipartite graph. The partition is constructed by minimizing a normalized sum of edge weights between unmatched pairs of vertices of the bipartite graph.
NTIS
Cluster Analysis; Data Processing; Graph Theory; Partitions (Mathematics)

20040047079 Rutherford Appleton Lab., Chilton
Null Space Algorithm and Spanning Trees in Solving Darcy's Equation
Arioli, M.; Manzini, G.; Dec. 2003; 20 pp.; In English
Report No.(s): PB2004-102651; RAL-TR-2002-026; Copyright; Avail: National Technical Information Service (NTIS)
A Null Space algorithm is considered to solve the augmented system produced by the mixed finite element approximation of Darcy's Law. The method is based on the combination of Gaussian factorization technique for sparse matrices with an iterative Krylov solver. The computational efficiency of the method relies on the use of spanning trees to compute the Gaussian factorization without fill-in and on a suitable stopping criterion for the iterative solver. We experimentally investigate its performance on a realistic set of selected application problems.
NTIS
Algorithms; Finite Element Method

20040047087 Lawrence Livermore National Lab., Livermore, CA
Image-Driven Mesh Optimization
Lindstrom, P.; Turk, G.; Jan. 05, 2001; 14 pp.; In English
Report No.(s): DE2003-15005455; UCRL-JC-141888; No Copyright; Avail: Department of Energy Information Bridge
We describe a method of improving the appearance of a low vertex count mesh in a manner that is guided by rendered images of the original, detailed mesh. This approach is motivated by the fact that greedy simplification methods often yield meshes that are poorer than what can be represented with a given number of vertices. Our approach relies on edge swaps and vertex teleports to alter the mesh connectivity, and uses the downhill simplex method to simultaneously improve vertex positions and surface attributes. Note that this is not a simplification method--the vertex count remains the same throughout the optimization. At all stages of the optimization the changes are guided by a metric that measures the differences between rendered versions of the original model and the low vertex count mesh. This method creates meshes that are geometrically

faithful to the original model. Moreover, the method takes into account more subtle aspects of a model such as surface shading or whether cracks are visible between two interpenetrating parts of the model.
NTIS
Computer Graphics; Mesh; Optimization; Simplex Method; Computational Grids

20040047092 Paris Univ., Orsay, France, Royal Inst. of Tech., Stockholm, Sweden
Complementary Pairs of Multilinear Polynomials
Saffari, B.; Shapiro, H. S.; 2003; 22 pp.; In English
Report No.(s): PB2004-104410; Copyright; Avail: National Technical Information Service (NTIS)
No abstract available
Polynomials; Mathematics

20040047258 Lawrence Livermore National Lab., Livermore, CA, USA
Validation of an Urban Parameterization in a Mesoscale Model
Leach, M. J.; Chin, H. N.; Jul. 19, 2001; 12 pp.; In English
Report No.(s): DE2004-15005675; UCRL-JC-144677; No Copyright; Avail: Department of Energy Information Bridge
The Atmospheric Science Division at Lawrence Livermore National Laboratory uses the Naval Research Laboratory's Couple Ocean-Atmosphere Mesoscale Prediction System (COAMPS) for both operations and research. COAMPS is a non-hydrostatic model, designed as a multi-scale simulation system ranging from synoptic down to meso, storm and local terrain scales. As model resolution increases, the forcing due to small- scale complex terrain features including urban structures and surflaces, intensifies. An urban parameterization has been added to the Naval Research Laboratory's mesoscale model, COAMPS. The parameterization attempts to incorporate the effects of buildings and urban surfaces without explicitly resolving them, and includes modifying the mean flow to turbulence energy exchange, radiative transfer, the surface energy budget, and the addition of anthropogenic heat.
NTIS
Parameterization; Atmospheric Physics; Prediction Analysis Techniques; Air Water Interactions

20040047275 Swedish Defence Research Establishment, Linkoeping
SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms
Bennet, F.; Fenelius, S.; Mar. 2003; In Swedish; In English
Report No.(s): PB2004-102227; FOI-R-0831-SE; No Copyright; Avail: National Technical Information Service (NTIS); Abstract Only
The purpose behind this thesis is to develop a software (SceneServer) which can generate data such as images and vertex lists from 3D computer models. These models are placed in a virtual environment and they can be controlled either from a graphical user interface (GUI) or from a MATLAB client. Data can be retrieved and processed in MATLAB. By creating a connection between MATLAB and a 3D environment, computer vision algorithms can be designed and tested swiftly, thus giving the developer a powerful platform. SceneServer allows the user to manipulate, in detail, the models and scenes to be rendered.
NTIS
Computer Graphics; Graphical User Interface; Computerized Simulation; Computer Vision

20040050172 Lawrence Livermore National Lab., Livermore, CA
Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms
Johnson, J. R.; Foster, I.; May 01, 2003; 14 pp.; In English
Report No.(s): DE2004-15005827; UCRL-JC-1532267; No Copyright; Avail: Department of Energy Information Bridge
A hybrid divide and conquer algorithm is one that switches from a divide and conquer to an iterative strategy at a specified problem size. Such algorithms can provide significant performance improvements relative to alternatives that use a single strategy. However, the identification of the optimal problem size at which to switch for a particular algorithm and platform can be challenging. We describe an automated approach to this problem that first conducts experiments to explore the performance space on a particular platform and then uses the resulting performance data to construct an optimal hybrid algorithm on that platform. We implement this technique in a tool, 'Ouroboros', that automatically constructs a high-performance hybrid algorithm from a set of registered algorithms. We present results obtained with this tool for several

classical divide and conquer algorithms, including matrix multiply and sorting, and report speedups of up to six times achieved over non-hybrid algorithms.
NTIS
Algorithms; Iteration; Automatic Control

20040050180 Department of Justice, Washington, DC, USA
Cybercrime against Businesses
Mar. 2004; 16 pp.; In English
Report No.(s): PB2004-104423; NCJ-200639; No Copyright; Avail: CASI; A03, Hardcopy

Among 198 businesses responding to a 2001 pilot survey, 74% reported being a victim of cybercrime. Other findings on the 198 businesses included the following: nearly two-thirds had been victimized by a computer virus at least once; a quarter had experienced denial of service attacks, such as the degradation of Internet connections due to excessive amounts of incoming information; about a fifth reported that their computer systems had been vandalized or sabotaged. These are some of the findings from the Computer Security Survey (CSS) 2001 pilot, which covered a group of 500 businesses nationwide. These findings are not nationally representative but illustrate the feasibility and utility of a data collection program to be initiated in 2004 among some 36,000 businesses.
NTIS
Computer Networks; Data Acquisition; Commerce

20040050184 Lawrence Livermore National Lab., Livermore, CA
Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis
Maghribi, M. N.; Jun. 10, 2003; 202 pp.; In English
Report No.(s): DE2004-15005780; UCRL-LR-153347; No Copyright; Avail: Department of Energy Information Bridge

Millions of people suffering from diseases such as retinitis pigmentosa and macular degeneration are legally blind due to the loss of photoreceptor function. Fortunately a large percentage of the neural cells connected to the photoreceptors remain viable, and electrical stimulation of these cells has been shown to result in visual perception. These findings have generated worldwide efforts to develop a retinal prosthesis device, with the hope of restoring vision. Advances in microfabrication, integrated circuits, and wireless technologies provide the means to reach this challenging goal. This dissertation describes the development of innovative silicone-based microfabrication techniques for producing an implantable microelectrode array. The microelectrode array is a component of an epiretinal prosthesis being developed by a multi-laboratory consortium. This array will serve as the interface between an electronic imaging system and the human eye, directly stimulating retinal neurons via thin film conducting traces. Because the array is intended as a long-term implant, vital biological and physical design requirements must be met. A retinal implant poses difficult engineering challenges due to the size of the intraocular cavity and the delicate retina. Not only does it have to be biocompatible in terms of cytotoxicity and degradation, but it also has to be structurally biocompatible, with regard to smooth edges and high conformability; basically mimicking the biological tissue. This is vital to minimize stress and prevent physical damage to the retina.
NTIS
Eye (Anatomy); Retina; Photoreceptors; Imaging Techniques; Visual Perception

20040050193 Lawrence Livermore National Lab., Livermore, CA
Characteristics of Workload on ASCI Blue-Pacific at Lawrence Livermore National Laboratory
Yoo, A. B.; Jette, M. A.; Aug. 14, 2000; 26 pp.; In English
Report No.(s): DE2004-15006159; UCRL-JC-140092; No Copyright; Avail: Department of Energy Information Bridge

Symmetric multiprocessor (SMP) clusters have become the prevalent computing platforms for large-scale scientific computation in recent years mainly due to their good scalability. In fact, many parallel machines being used at supercomputing centers and national laboratories are of this type. It is critical and often very difficult on such large-scale parallel computers to efficiently manage a stream of jobs, whose requirement for resources and computing time greatly varies. Understanding the characteristics of workload imposed on a target environment plays a crucial role in managing system resources and developing an efficient resource management scheme. A parallel workload is analyzed typically by studying the traces from actual production parallel machines. The study of the workload traces not only provides the system designers with insight on how to design good processor allocation and job scheduling policies for efficient resource management, but also helps system

administrators monitor and fine-tune the resource management strategies and algorithms.
NTIS
Resources Management; Multiprocessing (Computers)

20040050215 Lawrence Livermore National Lab., Livermore, CA
Approximate Splitting for Ensembles of Trees using Histograms
Kamath, C.; Cantu-Paz, E.; Littau, D.; Sep. 28, 2001; 22 pp.; In English
Report No.(s): DE2004-15005930; UCRL-JC-145576; No Copyright; Avail: Department of Energy Information Bridge
Recent work in classification indicates that significant improvements in accuracy can be obtained by growing an ensemble of classifiers and having them vote for the most popular class. Implicit in many of these techniques is the concept of randomization that generates different classifiers. In this paper, they focus on ensembles of decision trees that are created using a randomized procedure based on histograms. Techniques, such as histograms, that discretize continuous variables, have long been used in classification to convert the data into a form suitable for processing and to reduce the compute time. The approach combines the ideas behind discretization through histograms and randomization in ensembles to create decision trees by randomly selecting a split point in an interval around the best bin boundary in the histogram. The experimental results with public domain data show that ensembles generated using this approach are competitive in accuracy and superior in computational cost to other ensembles techniques such as boosting and bagging.
NTIS
Histograms; Data Processing; Trees (Mathematics); Classifications; Approximation

20040050216 Lawrence Livermore National Lab., Livermore, CA
Multiresolution Distance Volumes for Progressive Surface Compression
Laney, D. A.; Bertram, M.; Duchaineau, M. A.; Max, N. L.; Jan. 14, 2002; 18 pp.; In English
Report No.(s): DE2004-15005935; UCRL-JC-146852; No Copyright; Avail: Department of Energy Information Bridge
Surfaces generated by scientific simulation and range scanning can reach into the billions of polygons. Such surfaces must be aggressively compressed, but at the same time should provide for level of detail queries. Progressive compression techniques based on subdivision surfaces produce impressive results on range scanned models. However, these methods require the construction of a base mesh which parameterizes the surface to be compressed and encodes the topology of the surface. For complex surfaces with high genus and/or a large number of components, the computation of an appropriate base mesh is difficult and often infeasible. We present a surface compression method that stores surfaces as wavelet-compressed signed-distance volumes. Our method avoids the costly base-mesh construction step and offers several improvements over previous attempts at compressing signed-distance functions, including an(Omicron)(n) distance transform, a new zero set initialization method for triangle meshes, and a specialized thresholding algorithm. We demonstrate the potential of sampled distance volumes for surface compression and progressive reconstruction for complex high genus surfaces.
NTIS
Topology; Data Processing; Algorithms; Parameterization; Surface Geometry; Image Resolution

20040050226 Lawrence Livermore National Lab., Livermore, CA
Load Balanced Domain Decomposition Method using Wavelet Analysis
Jameson, L.; Johnson, J.; Hesthaven, J.; May 31, 2001; 24 pp.; In English
Report No.(s): DE2004-15005928; UCRL-JC-144075; No Copyright; Avail: Department of Energy Information Bridge
Wavelet Analysis provides an orthogonal basis set which is localized in both the physical space and the Fourier transform space. We present here a domain decomposition method that uses wavelet analysis to maintain roughly uniform error throughout the computation domain while keeping the computational work balanced in a parallel computing environment.
NTIS
Loads (Forces); Wavelet Analysis; Decomposition; Methodology

20040050247 Lawrence Livermore National Lab., Livermore, CA
Report on the HPSS Database Benchmark
Fisher, D.; Jun. 19, 2001; 16 pp.; In English
Report No.(s): DE2004-15006190; UCRL-ID-144274; No Copyright; Avail: Department of Energy Information Bridge
Concerns about the long-term viability of SFS as the metadata store for HPSS have been increasing. A concern that Transarc may discontinue support for SFS motivates us to consider alternative means to store HPSS metadata. The obvious

alternative is a commercial database. Commercial databases have the necessary characteristics for storage of HPSS metadata records. They are robust and scalable and can easily accommodate the volume of data that must be stored. They provide programming interfaces, transactional semantics and a full set of maintenance and performance enhancement tools. A team was organized within the HPSS project to study and recommend an approach for the replacement of SFS. Members of the team are David Fisher, Jim Minton, Donna Mecozzi, Danny Cook, Bart Parliman and Lynn Jones. We examined several possible solutions to the problem of replacing SFS, and recommended on May 22, 2000, in a report to the HPSS Technical and Executive Committees, to change HPSS into a database application over either Oracle or DB2. We recommended either Oracle or DB2 on the basis of market share and technical suitability. Oracle and DB2 are dominant offerings in the market, and it is in the best interest of HPSS to use a major player's product. Both databases provide a suitable programming interface. Transaction management functions, support for multi-threaded clients and data manipulation languages (DML) are available. These findings were supported in meetings held with technical experts from both companies. In both cases, the evidence indicated that either database would provide the features needed to host HPSS.
NTIS
Data Bases; Architecture (Computers); Data Storage; Computer Programming

20040050309 Lawrence Livermore National Lab., Livermore, CA
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach
Lee, B. S.; Snapp, R. R.; Musick, R.; Critchlow, T.; Dec. 17, 2001; 22 pp.; In English
Report No.(s): DE2004-15005946; UCRL-JC-146539; No Copyright; Avail: Department of Energy Information Bridge
We present our approach to enabling approximate ad hoc queries on terabyte-scale mesh data generated from large scientific simulations through the extension and integration of database, statistical, and data mining techniques. There are several significant barriers to overcome in achieving this objective. First, large-scale simulation data is already at the multi-terabyte scale and growing quickly, thus rendering traditional forms of interactive data exploration and query processing untenable. Second, a priori knowledge of user queries is not available, making it impossible to tune special-purpose solutions. Third, the data has spatial and temporal aspects, as well as arbitrarily high dimensionality, which exacerbates the task of finding compact, accurate, and easy-to-compute data models.
NTIS
Data Retrieval; Accuracy; Data Management

20040050316 General Accounting Office, Washington, DC
Critical Infrastructure Protection: Challenges and Efforts to Secure Control Systems
Mar. 2004; 52 pp.; In English
Report No.(s): PB2004-104302; GAO-04-354; No Copyright; Avail: CASI; A04, Hardcopy
Computerized control systems perform vital functions across many of our nation's critical infrastructures. For example, in natural gas distribution, they can monitor and control the pressure and flow of gas through pipelines. In October 1997, the President's Commission on Critical Infrastructure Protection emphasized the increasing vulnerability of control systems to cyber attacks. The House Committee on Government Reform and its Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census asked GAO to report on potential cyber vulnerabilities, focusing on (1) significant cybersecurity risks associated with control systems (2) potential and reported cyber attacks against these systems (3) key challenges to securing control systems and (4) efforts to strengthen the cybersecurity of control systems.
NTIS
Vulnerability; Computer Security

20040050323 Lawrence Livermore National Lab., Livermore, CA
hypre: A Library of High Performance Preconditioners
Falgout, R. D.; Yang, U. M.; Nov. 01, 2001; 16 pp.; In English
Report No.(s): DE2004-15006064; UCRL-JC-146175; No Copyright; Avail: Department of Energy Information Bridge
Hypre is a software library for the solution of large, sparse linear systems on massively parallel computers. Its emphasis is on modern powerful and scalable preconditioners. Hypre provides various conceptual interfaces to enable application users to access the library in the way they naturally think about their problems. This paper presents the conceptual interfaces in hypre. An overview of the preconditioners that are available in hypre is given, including some numerical results that show the efficiency of the library.
NTIS
Parallel Processing (Computers); Computer Programs; Parallel Computers

20040050359 Lawrence Livermore National Lab., Livermore, CA
PVODE Trio: PVODE, KINSOL, and IDA
Hindmarsh, A. C.; Brown, P.; Grant, K.; Lee, S.; Serban, R.; Oct. 01, 2001; 34 pp.; In English
Report No.(s): DE2004-15006305; UCRL-JC-145579; No Copyright; Avail: Department of Energy Information Bridge
No abstract available
Data Transmission; Computer Programs

20040050368 Lawrence Livermore National Lab., Livermore, CA
Feedback From Video From Virtual Reality Navigation
Tsap, L. V.; Oct. 27, 2000; 10 pp.; In English
Report No.(s): DE2004-15006285; UCRL-JC-141131; No Copyright; Avail: Department of Energy Information Bridge
Important preconditions for wide acceptance of virtual reality (VR) systems include their comfort, ease and naturalness to use. Most existing trackers super from discomfort-related issues. For example, body-based trackers (hand controllers, joysticks, helmet attachments, etc.) restrict spontaneity and naturalness of motion, while ground-based devices (e.g., hand controllers) limit the workspace by literally binding an operator to the ground. There are similar problems with controls. This paper describes using real-time video with registered depth information (from a commercially available camera) for virtual reality navigation. Camera-based setup can replace cumbersome trackers. The method includes selective depth processing for increased speed, and a robust skin-color segmentation for accounting illumination variations.
NTIS
Feedback; Real Time Operation; Information Systems

20040050382 Lawrence Livermore National Lab., Livermore, CA
Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs
Unger, S.; Mueller, F.; May 21, 2001; 18 pp.; In English
Report No.(s): DE2004-15006265; UCRL-JC-143798-R1; No Copyright; Avail: Department of Energy Information Bridge
This paper addresses the question of how to handle irreducible regions during optimization, which has become even more relevant for contemporary processors since recent VLIW-like architectures highly rely on instruction scheduling. The contributions of this paper are twofold. First, a method of optimized node splitting to transform irreducible regions of control flow into reducible regions is derived. This method is superior to approaches previously published since it reduces the number of replicated nodes by comparison. Second, three methods that handle regions of irreducible control flow are evaluated with respect to their impact on compiler optimizations: traditional and optimized node splitting as well as loop analysis through DJ graphs. Measurements show improvements of 1-40% for these methods of handling irreducible loop over the unoptimized case.
NTIS
Loops; Optimization; Education; Compilers

20040050392 Royal Inst. of Tech., Stockholm, Sweden
Elliptic Systems of Partial Differential Equations Generated by Vector Vields Which Degenerate at the Boundary of the Domain
Dzhuraev, A.; Jun. 2003; 24 pp.; In English
Report No.(s): PB2004-102647; TRITA-MAT-2003-12; No Copyright; Avail: CASI; A03, Hardcopy
In this paper we study some elliptic systems of partial differential equations in a bounded domain generated by a vector field which degenerates on the boundary of the domain.
NTIS
Elliptic Differential Equations; Boundaries

20040050408, Department of Energy, Tulsa, OK, USA
New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002
Pope, G. A.; Sepehrnoori, K.; Delshad, M.; 2002; 68 pp.; In English
Report No.(s): DE2004-820951; No Copyright; Avail: Department of Energy Information Bridge
The premise of this research is that a general-purpose reservoir simulator for several improved oil recovery processes can and should be developed so that high-resolution simulations of a variety of very large and difficult problems can be achieved

using state-of-the-art computing and computers. Such a simulator is not currently available to the industry. The goal of this proposed research is to develop a new-generation chemical flooding simulator that is capable of efficiently and accurately simulating oil reservoirs with at least a million gridblocks in less than one day on massively parallel computers. Task 1 is the formulation and development of solution scheme, Task 2 is the implementation of the chemical module, and Task 3 is validation and application. We have made significant progress on all three tasks and we are on schedule on both technical and budget. In this report, we will detail our progress on Tasks 1 through 3 for the first six months of the project.
NTIS
Simulation; Massively Parallel Processors

60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware and data processing. For components see *33 Electronics and Electrical Engineering*. For computer vision see *63 Cybernetics, Artificial Intelligence and Robotics*.

20040046914 National Inst. of Aerospace Research, Hampton, VA, USA, NASA Langley Research Center, Hampton, VA, USA
Rapid Prototyping in PVS
Munoz, Cesar A.; Butler, Ricky, Technical Monitor; November 2003; 26 pp.; In English
Contract(s)/Grant(s): NCC1-02043; 786-10-10-10
Report No.(s): NASA/CR-2003-212418; NIA-2003-03; No Copyright; Avail: CASI; A03, Hardcopy
PVSio is a conservative extension to the PVS prelude library that provides basic input/output capabilities to the PVS ground evaluator. It supports rapid prototyping in PVS by enhancing the specification language with built-in constructs for string manipulation, floating point arithmetic, and input/output operations.
Author
Rapid Prototyping; Theorem Proving; Logic Programming; Computer Animation; Computer Systems Programs

20040046918 NASA Langley Research Center, Hampton, VA, USA, National Inst. of Aerospace Research, Hampton, VA, USA
Match-bounded String Rewriting Systems
Geser, Alfons; Hofbauer, Dieter; Waldmann, Johannes; December 2003; 23 pp.; In English
Contract(s)/Grant(s): NCC1-02043; 786-10-10-10
Report No.(s): NASA/CR-2003-212685; NIA-2003-09; No Copyright; Avail: CASI; A03, Hardcopy
We introduce a new class of automated proof methods for the termination of rewriting systems on strings. The basis of all these methods is to show that rewriting preserves regular languages. To this end, letters are annotated with natural numbers, called match heights. If the minimal height of all positions in a redex is h+1 then every position in the reduct will get height h+1. In a match-bounded system, match heights are globally bounded. Using recent results on deleting systems, we prove that rewriting by a match-bounded system preserves regular languages. Hence it is decidable whether a given rewriting system has a given match bound. We also provide a sufficient criterion for the abence of a match-bound. The problem of existence of a match-bound is still open. Match-boundedness for all strings can be used as an automated criterion for termination, for match-bounded systems are terminating. This criterion can be strengthened by requiring match-boundedness only for a restricted set of strings, for instance the set of right hand sides of forward closures.
Author
Computer Systems Programs; Automatic Control; Language Programming; Mathematical Models

20040050279 Defence Science and Technology Organisation, Edinburgh, Australia
A Review of Narrative Methodology
Mitchell, M.; Egudo, M.; November 2003; 51 pp.; In English
Report No.(s): DSTO-GD-0385; DODA-AR-012-965; Copyright; Avail: Other Sources
This annotated bibliography focuses on the various approaches to studying narrative. It covers the approaches to narrative in an interdisciplinary manner, including the fields of psychology, sociology, linguistics, philosophy, anthropology, organization studies, and history. Narrative is an interpretive approach in the social sciences involving storytelling methodology. The story becomes an object of study, focusing on how individuals or groups make sense of events and actions in their lives. The theoretical underpinnings to narrative approaches are outlined as are the applied benefits of storytelling such

as how narrative conveys tacit knowledge, how it can enable sense making, and how it constructs identity. The study aims to explore the potential of narrative as a research tool for enhancing Army's understanding of knowledge acquisition in the context of Battle Command Training.
Author
Annotations; Anthropology; Linguistics; Bibliographies

20040050387 Lawrence Livermore National Lab., Livermore, CA
ASCI PSE Milepost: Run-Time Systems Performance Tests
de Supinski, B. R.; May 07, 2001; 14 pp.; In English
Report No.(s): DE2004-15006296; UCRL-JC-142563; No Copyright; Avail: Department of Energy Information Bridge

The Accelerated Strategic Computing Initiative (ASCI) Problem Solving Environment (PSE) consists of the tools and libraries needed for the development of ASCI simulation codes on ASCI machines. The recently completed ASCI PSE Milepost demonstrated that this software environment is available and functional at the scale used for application mileposts on ASCI White. As part of the PSE Milepost, we performed extensive performance testing of several critical run-time based systems. In this paper, we present microbenchmark results that compare the MPI, Pthreads and OpenMP implementations on ASCI White and ASCI Blue Pacific. Our results demonstrate that these run-time systems on White have improved sufficiently to accommodate the machine's approximately four-fold increase in processing capability over Blue Pacific.
NTIS
Computer Systems Performance; Computer Programs; Performance Tests

61
COMPUTER PROGRAMMING AND SOFTWARE

Includes software engineering, computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM. For computer software applied to specific applications, see also the associated category.

20040045266 NASA Langley Research Center, Hampton, VA, USA
Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept
Carrreno, Victor A.; Gottliebsen, Hanne; Butler, Ricky; Kalvala, Sara; March 2004; 44 pp.; In English
Contract(s)/Grant(s): WBS 23-786-10-10
Report No.(s): NASA/TM-2004-212999; NAS 1.15:212999; L-18449; No Copyright; Avail: CASI; A03, Hardcopy

New concepts for automating air traffic management functions at small non-towered airports raise serious safety issues associated with the software implementations and their underlying key algorithms. The criticality of such software systems necessitates that strong guarantees of the safety be developed for them. In this paper we present a formal method for modeling and verifying such systems using the PVS theorem proving system. The method is demonstrated on a preliminary concept of operation for the Small Aircraft Transportation System (SATS) project at NASA Langley.
Author
Air Traffic Control; Mathematical Models; Air Transportation; Automatic Control; General Aviation Aircraft

20040045306 NASA Ames Research Center, Moffett Field, CA, USA
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft
Wilson, Edward; Sutter, David W.; Berkovitz, Dustin; Betts, Bradley J.; Kong, Edmund; delMundo, Rommel; Lages, Christopher R.; Mah, Robert W.; Papasin, Richard; October 29, 2003; 10 pp.; In English; JANNAF 3rd Modeling and Simulation Joint Subcommittee Meeting, 1-5 Dec. 2003, Colorado Springs, CO, USA
Contract(s)/Grant(s): 302-10-10; PWC-349-00; No Copyright; Avail: CASI; A02, Hardcopy

By analyzing the motions of a thruster-controlled spacecraft, it is possible to provide on-line (1) thruster fault detection and isolation (FDI), and (2) vehicle mass- and thruster-property identification (ID). Technologies developed recently at NASA Ames have significantly improved the speed and accuracy of these ID and FDI capabilities, making them feasible for application to a broad class of spacecraft. Since these technologies use existing sensors, the improved system robustness and performance that comes with the thruster fault tolerance and system ID can be achieved through a software-only implementation. This contrasts with the added cost, mass, and hardware complexity commonly required by FDI. Originally developed in partnership with NASA - Johnson Space Center to provide thruster FDI capability for the X-38 during re-entry, these technologies are most recently being applied to the MIT SPHERES experimental spacecraft to fly on the International Space Station in 2004. The model-based FDI uses a maximum-likelihood calculation at its core, while the ID is based upon

recursive least squares estimation. Flight test results from the SPHERES implementation, as flown aboard the NASA KC-1 35A 0-g simulator aircraft in November 2003 are presented.
Author
Fault Detection; Thrustors; Isolation; System Identification

20040046899 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
High-Resolution Spectroscopic Database for the NASA Earth Observing System Program
Rothman, Laurence S.; March 2004; 24 pp.; In English
Contract(s)/Grant(s): NAG5-8420; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this project is to develop and enhance the HITRAN molecular spectroscopic database and associated - software to support the observational programs of the Earth observing System (EOS). In particular, the focus is on the EOS projects: the Atmospheric Infrared Sounder (AIRS), the High-Resolution Dynamics Limb Sounder (HIRDLS), Measurements of Pollution in the Troposphere (MOPITT), the Tropospheric Emission Spectrometer (TES), and the Stratospheric Aerosol and Gas Experiment (SAGE III). The HITRAN program is also involved in the Ozone Monitoring Experiment (OMI). The data requirements of these programs in terms of spectroscopy are varied with respect to constituents being observed, required remote-sensing parameters, and spectral coverage. A general requisite is for additional spectral parameters and improvements to existing molecular bands sufficient for the simulation of the observations leading to retrieval of the atmospheric state. In addition cross-section data for heavier molecular species must be expanded and made amenable to modeling in remote sensing. The effort in the project also includes developing software and distribution to make access, manipulation, and use HITRAN functional to the EOS program.
Author
Molecular Gases; Spectroscopy; Data Bases; Computer Programs; Spectrum Analysis; Ozone; Atmospheric Chemistry

20040050302 Institute for Human and Machine Cognition, Pensacola, FL, USA
CmapTools: A Software Environment for Knowledge Modeling and Sharing
Canas, Alberto J.; January 2004; 10 pp.; In English
Contract(s)/Grant(s): NCC2-1297; No Copyright; Avail: CASI; A02, Hardcopy

In an ongoing collaborative effort between a group of NASA Ames scientists and researchers at the Institute for Human and Machine Cognition (IHMC) of the University of West Florida, a new version of CmapTools has been developed that enable scientists to construct knowledge models of their domain of expertise, share them with other scientists, make them available to anybody on the Internet with access to a Web browser, and peer-review other scientists models. These software tools have been successfully used at NASA to build a large-scale multimedia on Mars and in knowledge model on Habitability Assessment. The new version of the software places emphasis on greater usability for experts constructing their own knowledge models, and support for the creation of large knowledge models with large number of supporting resources in the forms of images, videos, web pages, and other media. Additionally, the software currently allows scientists to cooperate with each other in the construction, sharing and criticizing of knowledge models. Scientists collaborating from remote distances, for example researchers at the Astrobiology Institute, can concurrently manipulate the knowledge models they are viewing without having to do this at a special videoconferencing facility.
Author
Computer Programs; Video Communication; Exobiology; Cognition

20040050333 Massachusetts Inst. of Tech., Cambridge, MA, USA
Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers
Kenny, Sean, Technical Monitor; Wertz, Julie; May 2002; 211 pp.; In English
Contract(s)/Grant(s): NAG1-01025
Report No.(s): SSL-9-02; Copyright; Avail: CASI; A10, Hardcopy

As technological systems grow in capability, they also grow in complexity. Due to this complexity, it is no longer possible for a designer to use engineering judgement to identify the components that have the largest impact on system life cycle metrics, such as reliability, productivity, cost, and cost effectiveness. One way of identifying these key components is to build quantitative models and analysis tools that can be used to aid the designer in making high level architecture decisions. Once these key components have been identified, two main approaches to improving a system using these components exist: add redundancy or improve the reliability of the component. In reality, the most effective approach to almost any system will be some combination of these two approaches, in varying orders of magnitude for each component. Therefore, this research tries

to answer the question of how to divide funds, between adding redundancy and improving the reliability of components, to most cost effectively improve the life cycle metrics of a system. While this question is relevant to any complex system, this research focuses on one type of system in particular: Separate Spacecraft Interferometers (SSI). Quantitative models are developed to analyze the key life cycle metrics of different SSI system architectures. Next, tools are developed to compare a given set of architectures in terms of total performance, by coupling different life cycle metrics together into one performance metric. Optimization tools, such as simulated annealing and genetic algorithms, are then used to search the entire design space to find the 'optimal' architecture design. Sensitivity analysis tools have been developed to determine how sensitive the results of these analyses are to uncertain user defined parameters. Finally, several possibilities for the future work that could be done in this area of research are presented.
Author
Reliability Analysis; Productivity; Models; Life (Durability); Interferometers; Cost Effectiveness

20040050354 NASA Marshall Space Flight Center, Huntsville, AL, USA
Space-based Science Operations Grid Prototype
Bradford, Robert N.; Welch, Clara L.; Redman, Sandra; [2004]; 1 pp.; In English; Eighth International Confrence on Space Operations Space Ops 2004: A Global Enterprise, 17-21 May 2004, Montreal, Canada; No Copyright; Avail: Other Sources; Abstract Only

Grid technology is the up and coming technology that is enabling widely disparate services to be offered to users that is very economical, easy to use and not available on a wide basis. Under the Grid concept disparate organizations generally defined as 'virtual organizations' can share services i.e. sharing discipline specific computer applications, required to accomplish the specific scientific and engineering organizational goals and objectives. Grids are emerging as the new technology of the future. Grid technology has been enabled by the evolution of increasingly high speed networking. Without the evolution of high speed networking Grid technology would not have emerged. NASA/Marshall Space Flight Center's (MSFC) Flight Projects Directorate, Ground Systems Department is developing a Space-based Science Operations Grid prototype to provide to scientists and engineers the tools necessary to operate space-based science payloads/experiments and for scientists to conduct public and educational outreach. In addition Grid technology can provide new services not currently available to users. These services include mission voice and video, application sharing, telemetry management and display, payload and experiment commanding, data mining, high order data processing, discipline specific application sharing and data storage, all from a single grid portal. The Prototype will provide most of these services in a first step demonstration of integrated Grid and space-based science operations technologies. It will initially be based on the International Space Station science operational services located at the Payload Operations Integration Center at MSFC, but can be applied to many NASA projects including free flying satellites and future projects. The Prototype will use the Internet2 Abilene Research and Education Network that is currently a 10 Gb backbone network to reach the University of Alabama at Huntsville and several other, as yet unidentified, Space Station based science experimenters. There is an international aspect to the Grid involving the America's Pathway (AMPath) network, the Chilean REUNA Research and Education Network and the University of Chile in Santiago that will further demonstrate how extensive these services can be used. From the user's perspective, the Prototype will provide a single interface and logon to these varied services without the complexity of knowing the where's and how's of each service. There is a separate and deliberate emphasis on security. Security will be addressed by specifically outlining the different approaches and tools used. Grid technology, unlike the Internet, is being designed with security in mind. In addition we will show the locations, configurations and network paths associated with each service and virtual organization. We will discuss the separate virtual organizations that we define for the varied user communities. These will include certain, as yet undetermined, space-based science functions and/or processes and will include specific virtual organizations required for public and educational outreach and science and engineering collaboration. We will also discuss the Grid Prototype performance and the potential for further Grid applications both space-based and ground based projects and processes. In this paper and presentation we will detail each service and how they are integrated using Grid
Derived from text
Computer Techniques; Data Processing; Data Storage; Payload Integration; Prototypes

20040050627 QSS Group, Inc., Cleveland, OH, USA
LSPRAY-II: A Lagrangian Spray Module
Raju, M. S.; March 2004; 41 pp.; In English
Contract(s)/Grant(s): NAS3-00145; WBS-22-714-20-06
Report No.(s): NASA/CR-2004-212958; NAS 1.26:212958; No Copyright; Avail: CASI; A03, Hardcopy

LSPRAY-II is a Lagrangian spray solver developed for application with parallel computing and unstructured grids. It is

designed to be massively parallel and could easily be coupled with any existing gas-phase flow and/or Monte Carlo Probability Density Function (PDF) solvers. The solver accommodates the use of an unstructured mesh with mixed elements of either triangular, quadrilateral, and/or tetrahedral type for the gas flow grid representation. It is mainly designed to predict the flow, thermal and transport properties of a rapidly vaporizing spray because of its importance in aerospace application. The manual provides the user with an understanding of various models involved in the spray formulation, its code structure and solution algorithm, and various other issues related to parallelization and its coupling with other solvers. With the development of LSPRAY-II, we have advanced the state-of-the-art in spray computations in several important ways.
Author
Algorithms; Flow Characteristics; Tetrahedrons; Thermodynamic Properties; Lagrangian Function

20040050641 L-3 Communications Analytics Corp., Rome, NY
National Institute of Justice Center Requirements Definition, Technical Assistance, Agile Test and Evaluation and Cyber Science Analysis
Frantz, Frederick K.; Sallustio, John; Dec. 2003; 33 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): F30602-97-D-0070/0021; Proj-NIJR
Report No.(s): AD-A420882; AFRL-IF-RS-TR-2003-296; No Copyright; Avail: CASI; A03, Hardcopy

This task provided for assembly, definition, and completion of technical enhancements in coordination with the National Law Enforcement and Corrections Technology Center - Northeast Region (NLECTC-NE). It also provided for Test and Evaluation (T&E) for the Advanced Generation of Interoperability for Law Enforcement (AGILE) and for analysis and assessment in cyber science including computer forensics. The mission of the NLECTC-NE in conjunction with the Air Force Research Laboratory/Information Directorate (AFRL/IF), is to facilitate the identification, development, and adoption of new products and technologies specifically designed for law enforcement, corrections, and other criminal justice applications. The current technology thrust areas for the NLECTC-NE are Concealed Weapons Detection (CWD), Secure Communications, Communications Interoperability, Timeline Analysis, Computer Forensics, Audio/Video Processing, Information Management, Automatic Speaker Recognition, Automatic Language Translation and Facial Recognition. This report outlines the major accomplishments of the task and identifies on-going technology efforts. These accomplishments include outreach activities, scientific and engineering assistance, AGILE development and technology demonstration activities, cyber crime initiatives, and Integrated Border Enforcement Teams (I BET) technology support.
DTIC
Intelligence

20040050688 Army Research Inst. for the Behavioral and Social Sciences, Fort Knox, KY
Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3
Lickteig, Carl W.; Sanders, William R.; Durlach, Paula J.; Carnahan, Thomas J.; Feb. 2004; 117 pp.; In English
Contract(s)/Grant(s): Proj-A790
Report No.(s): AD-A420960; ARI-RR-1819; No Copyright; Avail: CASI; A06, Hardcopy

The Army's ongoing transformation to Future Combat Systems (FCS) requires an unprecedented alliance of humans and machines. Creating an alliance that actually improves, and does not impede, battle command is a human systems integration challenge for FCS and particularly the area of command and control (C2). To address that challenge, the FCS C2 program is investigating future battle command concepts at the small unit level. The FCS C2 effort, led by Defense Advanced Research Projects Agency (DARPA) and Communications Electronics and Engineering Command (CECOM) with a focus on human performance by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), included a series of four command group- in-the-loop experiments from October 2001 to March 2003. This report provides exemplar research methods and findings on human performance from Experiment 3. The human performance findings reported are based on subjective measures and highly detailed objective measures of the command group's verbal and human-computer interactions. Interim conclusions are provided on the following topics: workload, training, automated measures, and human-system integration. In closing, a brief set of sustain and improve recommendations are provided for future research efforts. A companion report provides a more comprehensive assessment of future command group performance across FCS C2 Experiments IA (Lickteig, Sanders, Durlach, Lussier, & Carnahan, In Preparation).
DTIC
Combat; Command and Control; Human-Computer Interface

20040050852 Army Construction Engineering Research Lab., Champaign, IL
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations
Lozar, Robert C.; Ehlschlaeger, C. R.; Cox, Jennifer; May 2003; 45 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): Proj-622720A896
Report No.(s): AD-A421209; ERDC/CERL-TR-03-9; No Copyright; Avail: CASI; A03, Hardcopy

Recent advances in computer analysis techniques based on remotely sensed satellite images can be used with other geographic information systems (GIS) data to establish a scientifically derived baseline of growth near military installations. Developing such a trend analysis is one step in support of a military initiative to identify and mitigate pressure on its military mission activities due to the development or placement of land uses near installation boundaries. The new land uses, often described as 'encroachment,' may in some way conflict with the ongoing activities at an installation. This study documents a unique procedure called 'CellPicker' to generate land cover changes using satellite images and contextual GIS data for the each decade beginning in the 1970s.
DTIC
Cities; Geographic Information Systems; Histories; Imagery; Trends

20040050925 NASA Glenn Research Center, Cleveland, OH, USA
Computational Data Compression for Effective Storage/Retrieval
Abumeri, Galib H.; Kuguoglu, Latife H.; Chamis, Christos C.; November 2003; 16 pp.; In English; SAMPE 2003, 11-15 May 2003, Long Beach, CA, USA
Contract(s)/Grant(s): WBS-22-706-48-11
Report No.(s): NASA/TM-2003-212709; E-14219; No Copyright; Avail: CASI; A03, Hardcopy

As the use of networked computers continued its growth and storage devices became smaller, faster and affordable, the need for efficient and rapid storage and retrieval of material data has increased considerably. In this paper, a powerful computational tool known as the Multi-Factor Interaction Model (MFIM) is used to compress material test data and efficiently store and retrieve these data. The process of data compression and retrieval is demonstrated for high temperature alloy modulus, yield and ultimate strength, 1000 hours rupture strength, thermal expansion coefficient, and thermal conductivity. MFIM can be used to predict material behavior when little data is available and can account for single or multiple effects on the material response. This is demonstrated with an example showing the combined effect of temperature and stress in predicting the time dependent rupture strength of a high temperature alloy.
Author
Data Compression; Data Processing; Data Storage; Computer Programs

20040051027 Massachusetts Inst. of Tech., MA, USA
Surface Generation and Cartesian Mesh Support
Haimes, Robert; [2004]; 20 pp.; In English; See also 20040051028 - 20040051028
Contract(s)/Grant(s): NAG2-1458; No Copyright; Avail: CASI; A03, Hardcopy

This document serves as the final report for the grant titled Surface Generation and Cartesian Mesh Support . This completed work was in algorithmic research into automatically generating surface triangulations from CAD geometries. NASA's OVERFLOW and Cart3D simulation packages use surface triangulations as an underlying geometry description and the ability to automatically generate these from CAD files (without translation) substantially reduces both the wall-clock time and expertise required to get geometry out of CAD and into mesh generation. This surface meshing was exercised greatly during the Shuttle investigation during the last year with success. The secondary efforts performed in this grant involve work on a visualization system cut-cell handling for Cartesian Meshes with embedded boundaries.
Author
Computer Aided Design; Grid Generation (Mathematics)

20040051028 NASA Ames Research Center, Moffett Field, CA, USA
Watertight Anisotropic Surface Meshing Using Quadrilateral Patches
Haimes, Robert; Aftosmis, Michael J.; Surface Generation and Cartesian Mesh Support; [2004]; 11 pp.; In English; See also 20040051027; Original contains black and white illustrations
Contract(s)/Grant(s): NAG2-1458; No Copyright; Avail: CASI; A03, Hardcopy

This paper presents a simple technique for generating anisotropic surface triangulations using unstructured quadrilaterals

when the CAD entity can be mapped to a logical rectangle. Watertightness and geometric quality measures are maintained and are consistent with the CAPRI default tessellator. These triangulations can match user specified criteria for chord-height tolerance, neighbor triangle dihedral angle, and maximum triangle side length. This discrete representation has hooks back to the owning geometry and therefore can be used in conjunction with these entities to allow for easy enhancement or modification of the tessellation suitable for grid generation or other downstream applications.
Author
Triangulation; Computer Aided Design

62
COMPUTER SYSTEMS

Includes computer networks and distributed processing systems. For information systems see *82 Documentation and Information Science*. For computer systems applied to specific applications, see the associated category.

20040045291 NASA Ames Research Center, Moffett Field, CA, USA
Use of the SCIRun PSE for Coupled Fluid-Structure Analysis
Cheung, Christopher; Guruswamy, Guru P.; December 15, 2003; 12 pp.; In English; Eleventh Conference on Parallel Processing for Scientific Computing, February 2004, San Francisco, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

The objective of this paper is to investigate the use of Problem Solving Environments (PSE) for tightly coupled fluid-structure control analysis of aerospace vehicles. The topics include: 1) Background; 2) The SCIRun PSE; 3) Projects Done with SCIRun; 4) Research Procedures; 5) Installtion; 6) Installation Problems on NAS; 7) Module Development; 8) Module Testing Framework; 9) Time Testing of SCIRun; and 10) Time Test Results. This paper is in viewgraph form.
CASI
Problem Solving; Programming Environments; Computerized Simulation; Supercomputers; Fluid Dynamics

20040046139 QSS Group, Inc., Moffett Field, CA, USA
Adding Assurance to Automatically Generated Code
Denney, Ewen; Fischer, Bernd; Schumann, Johann; [2004]; 3 pp.; In English; High Assurance Systems Engineering 2, 2 Mar. 2004, Tampa, FL, USA; No Copyright; Avail: CASI; A01, Hardcopy

Code to estimate position and attitude of a spacecraft or aircraft belongs to the most safety-critical parts of flight software. The complex underlying mathematics and abundance of design details make it error-prone and reliable implementations costly. AutoFilter is a program synthesis tool for the automatic generation of state estimation code from compact specifications. It can automatically produce additional safety certificates which formally guarantee that each generated program individually satisfies a set of important safety policies. These safety policies (e.g.. array-bounds, variable initialization) form a core of properties which are essential for high-assurance software. Here we describe the AutoFilter system and its certificate generator and compare our approach to the static analysis tool PolySpace.
Author
Automatic Control; State Estimation; Network Synthesis; Computer Systems Programs; Satellite Attitude Control; Architecture (Computers)

20040050168 Lawrence Livermore National Lab., Livermore, CA
Performance of Neural Networks Methods in Intrusion Detection
Dao, V. N. P.; Vemuri, R.; Jul. 09, 2001; 12 pp.; In English
Report No.(s): DE2004-15005778; UCRL-JC-144473; No Copyright; Avail: Department of Energy Information Bridge

By accurately profiling the users via their unique attributes, it is possible to view the intrusion detection problem as a classification of authorized users and intruders. This paper demonstrates that artificial neural network (ANN) techniques can be used to solve this classification problem. Furthermore, the paper compares the performance of three neural networks methods in classifying authorized users and intruders using synthetically generated data. The three methods are the gradient descent back propagation (BP) with momentum, the conjugate gradient BP, and the quasi-Newton BP.
NTIS
Neural Nets; Performance; Intrusion Detection (Computers)

20040050424 Research and Technology Organization, Neuilly-sur-Seine, France
Analysis of the Military Effectiveness of Future C2 Concepts and Systems
December 2003; 320 pp.; In English; In French; Analysis of the Military Effectiveness of Future C2 Concepts and Systems, 23-25 Apr. 2002, The Hague, Netherlands; See also 20040050425 - 20040050459
Report No.(s): RTO-MP-117; AC/323(SAS-039)TP/32; Copyright; Avail: CASI; A14, Hardcopy

SAS-039 has been commissioned by NATO to conduct a formal review of the revised and extended COBP, and to review current analyses that demonstrate best practices in C2 analyses among member countries. The following materials contain both discussions of the revised and extended COBP, as well as best practices in current C2 analyses. In order to expand the COBP to reflect the full range and complexity of C2, SAS-039 solicited papers on the following topics: Operations Other Than War (OOTW); Novel Command and Control Arrangements; Information Superiority Concepts; Network Centric Concepts; and Distributed/Adaptive C2 Approaches.
Author
Military Operations; Decision Making; Data Processing

20040050749 Library of Congress, Washington, DC
Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress
Wilson, Clay; Oct. 17, 2003; 35 pp.; In English
Report No.(s): AD-A421056; No Copyright; Avail: CASI; A03, Hardcopy

Persistent computer security vulnerabilities may expose U.S. critical infrastructure and government computer systems to possible cyber attack by terrorists, possibly affecting the economy or other areas of national security. This report discusses possible cyber capabilities of terrorists and sponsoring nations, describes how computer security vulnerabilities might be exploited through a cyber terror attack, and raises some potential issues for Congress. Currently no evidence exists that terrorist organizations are actively planning to use computers as a means of attack, and there is disagreement among some observers about whether critical infrastructure computers offer an effective target for furthering terrorists' goals. However, terrorist organizations now use the Internet to communicate, and news reports have indicated that Al Qaeda and other groups may be using computer technology to help plan future terrorist attacks. At the same time, nuisance attacks against computer systems and the Internet are becoming more rapid and widespread, indicating that computer system vulnerabilities persist despite growing concerns about possible effects on national security.
DTIC
Policies; Security; Vulnerability

63
CYBERNETICS, ARTIFICIAL INTELLIGENCE AND ROBOTICS

Includes feedback and control theory, information theory, machine learning, and expert systems. For related information see also *54 Man/System Technology and Life Support*.

20040045295 NASA Ames Research Center, Moffett Field, CA, USA
Self-Sustaining Robotic Ecologies and Space Architecture
Colombano, Silvano P.; January 2004; 27 pp.; In English; AIAA Design Technical Committee Meeting, 6 Jan. 2004, Reno, NV, USA; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the folowing: rom 'one shot' explorations to infrastructure building. Challenges to infrastructure building. Modularity and self-sustaining robotic ecologies. A pathway to human presence. Robotic ' archntecture'. The 'robosphere' concept.
CASI
Robotics; Life (Durability); Exploration

20040046138 QSS Group, Inc., Moffett Field, CA, USA
A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems
Gupta, Pramod; Schumann, Johann; [2004]; 2 pp.; In English; HASE 2004, 2004; No Copyright; Avail: CASI; A01, Hardcopy

High reliability of mission- and safety-critical software systems has been identified by NASA as a high-priority technology challenge. We present an approach for the performance analysis of a neural network (NN) in an advanced adaptive control system. This problem is important in the context of safety-critical applications that require certification, such as flight software in aircraft. We have developed a tool to measure the performance of the NN during operation by calculating a

confidence interval (error bar) around the NN's output. Our tool can be used during pre-deployment verification as well as monitoring the network performance during operation. The tool has been implemented in Simulink and simulation results on a F-15 aircraft are presented.
Author
Adaptive Control; Neural Nets; Program Verification (Computers); Automatic Flight Control; Artificial Intelligence; Software Engineering; Computer Systems Performance

20040047020 Ljubljana Univ., Ljubljana, Slovenia
Latched Recurrent Neural Network
Ster, Branko; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 46-51; In English; See also 20040047018; Copyright; Avail: Other Sources

An extended architecture of recurrent neural networks is proposed. It is based on ignoring unimportant input information using a register of latches as the input layer of the network. The latch is implemented with a multiplexer 2/1 whose output is differentiable with respect to all of its inputs, thus enabling the derivatives to be propagated through the network. The relevance of input vectors is learned together with the weights of the network using a gradient-based algorithm.
Author
Architecture (Computers); Neural Nets

20040050704 Michigan Univ., Ann Arbor, MI
Computational Modeling of Human Multiple-Task Performance and Mental Workload
Meyer, David E.; Kleras, David E.; Mar. 8, 2004; 22 pp.; In English
Contract(s)/Grant(s): N00014-92-J-1173
Report No.(s): AD-A420989; TR-04/ONR-EPIC-15; No Copyright; Avail: CASI; A03, Hardcopy

This report summarizes the results of an extended project in which a computational modeling system for human cognition and performance, named EPIC (Executive- Process/Interactive Control) was developed, applied to several types of tasks to accurately represent human performance, and inspired to collection of new data that cast new light on the scientific analysis of key phenomena in human performance and cognition. The report summarizes the accomplishments of the project, and includes a complete list of publications and presentations of the project work.
DTIC
Cognition; Human Performance; Mental Performance; Psychology; Psychomotor Performance; Tasks; Workloads (Psychophysiology)

20040050756 Princeton Univ., NJ
High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies
Law, Chung K.; Mar. 10, 2004; 5 pp.; In English
Contract(s)/Grant(s): F49620-01-1-0233
Report No.(s): AD-A421064; AFRL-SR-AR-TR-04-0161; No Copyright; Avail: CASI; A01, Hardcopy

Two high-speed imaging systems were acquired for ongoing combustion research supported by AFOSR and ARO. All research programs involve extensive experimentation of unsteady flows, such as the bouncing/merging events for colliding droplets, the propagation of high- speed premixed flames, and the complex ignition kinetics in turbulent flows. Superior spatially and temporally resolved images have since been obtained with these systems.
DTIC
Collisions; Combustion; Drops (Liquids); High Speed; High Speed Cameras; Image Processing; Imaging Techniques

64
NUMERICAL ANALYSIS

Includes iteration, differential and difference equations, and numerical approximation.

20040045324 NASA Glenn Research Center, Cleveland, OH, USA
Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model
Kuguoglu, Latife H.; Binienda, Wieslaw K.; Roberts, Gary D.; February 2004; 48 pp.; In English
Contract(s)/Grant(s): WBS 22-708-24-05
Report No.(s): NASA/TM-2004-212328; NAS 1.15:212328; E-13923; No Copyright; Avail: CASI; A03, Hardcopy

A boundary-value problem governing a three-phase concentric-cylinder model was analytically modeled to analyze annular interfacial crack problems with Love s strain functions in order to find the stress intensity factors (SIFs) and strain energy release rates (SERRs) at the tips of an interface crack in a nonhomogeneous medium. The complex form of a singular integral equation (SIE) of the second kind was formulated using Bessel s functions in the Fourier domain, and the SIF and total SERR were calculated using Jacoby polynomials. For the validity of the SIF equations to be established, the SIE of the three-concentric-cylinder model was reduced to the SIE for a two-concentric-cylinder model, and the results were compared with the previous results of Erdogan. A preliminary set of parametric studies was carried out to show the effect of interphase properties on the SERR. The method presented here provides insight about the effect of interphase properties on the crack driving force.
Author
Concentric Cylinders; Fracture Mechanics; Singular Integral Equations; Strain Energy Release Rate; Crack Propagation

20040045358 Universities Space Research Association, Huntsville, AL, USA
Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment
Mazuruk, Konstantin; [2004]; 1 pp.; In English; Fifteenth American Conference on Crystal Growth and Epitaxy, 20-24 Jul. 2003, Keystone, CO, USA
Contract(s)/Grant(s): NCC-866; No Copyright; Avail: Other Sources; Abstract Only

Traveling magnetic fields offer a direct control of the metallic melt meridional flow in long cylinders. It induces the Lorentz body force that can counteract with the buoyancy force induced by radial temperature non-uniformity. It can significantly offset a natural convection in the system, or it can even set up the flow in opposite direction, thus affecting the interface shape, the growth rate and macrosegregation. Results of our numerical modeling of the Vertical Bridgman crystal growth of InSb will be discussed. The experimental part of this investigation will address the effect of the applied traveling magnetic fields on the interface shape of InSb crystals. Specifics of the growth apparatus design for this research will be provided in details.
Author
Magnetic Fields; Bridgman Method; Crystal Growth; Lorentz Force

20040046137 Kestrel Technology, LLC, Moffett Field, CA, USA
Static Analysis of C Programs
Venet, Arnaud; Brat, Guillaume; [2003]; 13 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

Contents include the following: Motivation. Cost of losing missions. Introduction to Static Analysis:definition, defect classes, applicability issues, specialization, analysis of MPF. C Global Surveyor (CGS): fact sheet, CGS phases, example. Conclusions.
Derived from text
Static Characteristics; C++ (Programming Language); Costs; Losses

20040047188 NASA Langley Research Center, Hampton, VA, USA
Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations
Dowek, Gilles; Munoz, Cesar; Carreno, Victor A.; March 2004; 46 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): NCC1-02043; WU 23-786-10-10
Report No.(s): NASA/TM-2004-213006; L-18361; No Copyright; Avail: CASI; A03, Hardcopy

An abstract mathematical model of the concept of operations for the Small Aircraft Transportation System (SATS) is presented. The Concept of Operations consist of several procedures that describe nominal operations for SATS, Several safety properties of the system are proven using formal techniques. The final goal of the verification effort is to show that under nominal operations, aircraft are safely separated. The abstract model was written and formally verified in the Prototype Verification System (PVS).
Author
Mathematical Models; Safety

20040047189 NASA Langley Research Center, Hampton, VA, USA
Stochastic Optimal Control via Bellman's Principle
Crespo, Luis G.; Sun, Jian Q.; December 2003; 29 pp.; In English
Contract(s)/Grant(s): NCC1-02043; WBS-762-20-61-01
Report No.(s): NASA/CR-2003-212419; NIA Report No. 2003-04; NAS 1.26:212419; No Copyright; Avail: CASI; A03, Hardcopy

This paper presents a method for finding optimal controls of nonlinear systems subject to random excitations. The method is capable to generate global control solutions when state and control constraints are present. The solution is global in the sense that controls for all initial conditions in a region of the state space are obtained. The approach is based on Bellman's Principle of optimality, the Gaussian closure and the Short-time Gaussian approximation. Examples include a system with a state-dependent diffusion term, a system in which the infinite hierarchy of moment equations cannot be analytically closed, and an impact system with a elastic boundary. The uncontrolled and controlled dynamics are studied by creating a Markov chain with a control dependent transition probability matrix via the Generalized Cell Mapping method. In this fashion, both the transient and stationary controlled responses are evaluated. The results show excellent control performances.
Author
Optimal Control; Stochastic Processes; Nonlinear Systems; Hamilton-Jacobi Equation; Bellman Theory; Numerical Analysis

20040047194 NASA Langley Research Center, Hampton, VA, USA
Contributions of Spherical Harmonics to Magnetic and Gravitational Fields
Roithmayr, Carlos M.; March 2004; 15 pp.; In English
Contract(s)/Grant(s): WU 23-319-30-02
Report No.(s): NASA/TM-2004-213007; L-18358; No Copyright; Avail: CASI; A03, Hardcopy

Gravitational forces are of cardinal importance in the dynamics of spacecraft; magnetic attractions sometime play a significant role also, as was the case with the Long Duration Exposure Facility, and as is now true for the first segment of Space Station Freedom. Both satellites depend on gravitational moment and a device known as a magnetic damper to stabilize their orientation. Magnetic fields are mathematically similar to gravitational fields in one important respect: each can be regarded as a gradient of a potential function that, in turn, can be described as an infinite series of spherical harmonics. Consequently, the two fields can be computed, in part, with quantities that need only be evaluated once, resulting in a savings of time when both fields are needed. The objective of this material is to present magnetic field and gravitational force expressions, and point out the terms that belong to both this is accomplished in Section 1 and 2. Section 3 contains the deductive reasoning with which one obtains the expressions of interest. Finally, examples in Section 4 show these equations can be used to reproduce others that arise in connection with special cases such as the magnetic field produced by a tilted dipole, and gravitational force exerted by an oblate spheroid. The mathematics are discussed in the context of terrestrial fields; however, by substituting appropriate constants, the results can be made applicable to fields belonging to other celestial bodies. The expressions presented here share the characteristics of algorithms set forth for computing gravitational force. In particular, computation is performed speedily by means of recursion formulae, and the expressions do not suffer from the shortcoming of a singularity when evaluated at points that lie on the polar axis.
Author
Spherical Harmonics; Gravitational Fields; Magnetic Fields; Computation; Celestial Bodies

20040047268 Alabama Univ., Huntsville, AL, USA
Applying a Genetic Algorithm to Reconfigurable Hardware
Wells, B. Earl; Weir, John; Trevino, Luis; Patrick, Clint; Steincamp, Jim; January 2004; 3 pp.; In English; 36th Annual Southeastern Symposium on System Theory, 14-16 Mar. 2004, Atlanta, GA, USA; No Copyright; Avail: CASI; A01, Hardcopy

This paper investigates the feasibility of applying genetic algorithms to solve optimization problems that are implemented entirely in reconfgurable hardware. The paper highlights the pe$ormance/design space trade-offs that must be understood to effectively implement a standard genetic algorithm within a modem Field Programmable Gate Array, FPGA, reconfgurable hardware environment and presents a case-study where this stochastic search technique is applied to standard test-case problems taken from the technical literature. In this research, the targeted FPGA-based platform and high-level design environment was the Starbridge Hypercomputing platform, which incorporates multiple Xilinx Virtex II FPGAs, and the Viva TM graphical hardware description language.
Author
Genetic Algorithms; Reconfigurable Hardware; Field-Programmable Gate Arrays

20040050169 Lawrence Livermore National Lab., Livermore, CA
Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets
Cook, R.; Max, N.; Silva, C.; Williams, P.; Apr. 01, 2001; 12 pp.; In English
Report No.(s): DE2004-15005779; UCRL-JC-143126; No Copyright; Avail: Department of Energy Information Bridge

The authors describe the SXMPVO algorithm for performing a visibility ordering zoo-meshed polyhedra. The algorithm runs in practice in linear time and the visibility ordering which it produces is exact.
NTIS
Algorithms; Polyhedrons; Computational Grids

20040050385 Lawrence Livermore National Lab., Livermore, CA
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods
Chang, B.; Lee, B.; Dec. 13, 2000; 22 pp.; In English
Report No.(s): DE2004-15006292; UCRL-JC-141742; No Copyright; Avail: Department of Energy Information Bridge
Solving the linear Boltzmann equation in neutron scattering phenomena presents many challenges to standard numerical schemes in computational physics. For an SN discretization, the so-called ray effects pollute the numerical solution. This pollution can be viewed mathematically as 'contamination' from a poorly chosen approximating basis set for the angle component of the discretization-i.e., collocation in angle is equivalent to discretization with delta basis functions, which form a poor approximating basis set. Fortunately, a PN discretization, which uses a better approximating basis set (i.e., spherical harmonics), eliminates these ray effects. Unfortunately, solving for the moments or PN equations is difficult. Moments couple strongly with each other, creating a strongly coupled system of partial differential equations (pde's) ; numerical algorithms for solving such strongly coupled systems are difficult to develop. In this paper, novel algorithms for solving this coupled system are presented. In particular, algorithms for solving the PN discretization of the linear Boltzmann equation using a first-order system least-squares (FOSLS) methodology are presented.
NTIS
Finite Element Method; Boltzmann Transport Equation; Least Squares Method

20040050774 Leonard Wood Army Community Hospital, Fort Leonard Wood, MO
A Comprehensive Study of the Incentive Award Program at General Leonard Wood Army Community Hospital
Cox, Michael L.; Aug. 8, 2001; 96 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421098; AMDCS-19-01; No Copyright; Avail: CASI; A05, Hardcopy
General Leonard Wood Army Community Hospital's (GLWACH) Partnership Forum, a collection of supervisors, employees, and union representatives, feel the current incentive award program is a major source of worker discontent. Therefore, they commissioned this study to evaluate the present incentive award program based on fairness and effectiveness and to explore methods of reshaping the program into one that both rewards appropriate behavior and motivates employees. The study is broken into three phases. In Phase I, a retrospective study looked at the current incentive award program to determine if awards distribution is equitable. The null hypothesis, awards distributions at GLWACH are equitable based on the variables of grade, gender, and division, is accepted at a a = .05 level of significance. Phase 2 consisted of conducting a comparison based on survey results, between post and hospital employees in reference to incentive award programs. Mirroring the earlier results, 80% of hospital respondents believed that employees should receive monetary awards for doing their job well and 70% agreed that monetary awards should be tied to cost savings and/or improved organizational performance. Although there seems to be consensus on making award dollars available, how employees feel this money should be distributed is not so apparent and may be adding to managements uncertainty about the awards process. Finally, Phase 3 utilized a case study approach to analyze both the anecdotal and empirical evidence in current literature. Survey results and comments made on the survey, suggest that perception and expectation are playing a role in the general disillusionment with GLWACH's incentive award program. Therefore, recommendations are tailored to enhance employee perception and expectation, related to the program.
DTIC
Hospitals; Incentives; Wood

65
STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; time series analysis; and stochastic processes.

20040050276 Defence Science and Technology Organisation, Edinburgh, Australia
An Introduction to Bayesian Belief Networks and their Applications to Land Operations
Starr, Colin; Shi, Peng; January 2004; 38 pp.; In English
Report No.(s): DSTO-TN-0534; DODA-AR-013-005; Copyright; Avail: Other Sources

Bayesian belief networks are graphical tools that aid reasoning and decision-making under uncertainty. The networks represent a system over which a probability distribution is defined, modelling uncertainty both quantitatively and qualitatively. They allow a user to make inferences when only limited information is available. Mathematically, a Bayesian network is a directed acyclic graph whose nodes represent variables. A link from one node to another represents a causal dependency. This report investigates the use of Bayesian networks in the land force environment. It provides a simple introduction to the networks, how they are constructed and how they are used. Some examples are presented to demonstrate the capabilities of the networks, a range of land force applications are discussed, and some theoretical extensions are examined.
Author
Belief Networks; Decision Making; Bayes Theorem

20040050328 General Accounting Office, Washington, DC
Federal Law Enforcement: Information on Use of Investigation and Arrest Statistics
Mar. 2004; 70 pp.; In English
Report No.(s): PB2004-104286; GAO-04-411; No Copyright; Avail: CASI; A04, Hardcopy
The 21st Century Department of Justice Appropriations Authorization Act (P.L. 107-273) requires GAO to report on how investigation and arrest statistics are reported and used by federal law enforcement agencies. This report provides information on (1) the guidance and procedures followed by federal law enforcement agencies regarding counting investigations and arrests, (2) how investigation and arrest statistics are used, and (3) whether multiple agencies are counting and reporting the same investigations and arrests. GAO selected six agencies for review: the Drug Enforcement Administration (DEA), the Federal Bureau of Investigation (FBI), the former Immigration and Naturalization Service (INS), the U.S. Marshals Service, the former U.S. Customs Service, and the U.S. Postal Inspection Service (USPIS).
NTIS
Law (Jurisprudence); Investigation

20040050612 Brookhaven National Lab., Upton, NY, USA
Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency
Tannenbaum, M. J.; October 14, 1994; 16 pp.; In English; Hot Hadronic Matter: Theory and Experiment, 27 Jun. - 1 Jul. 1994, Divonne-Les-Bains, France
Contract(s)/Grant(s): W-31-109-eng-38; DE-AC02-76CH-00016; DE-FG02-86ER-40281; W-7405-eng-48; DE-AC02-76ER-03069; DE-FG03-86ER-40271; NGR-05-003-513
Report No.(s): BNL-61074; Conf-9406274-4; No Copyright; Avail: CASI; A03, Hardcopy
The concept of 'Intermittency' was introduced by Bialas and Peschanski to try to explain the 'large' fluctuations of multiplicity in restricted intervals of rapidity or pseudorapidity. A formalism was proposed to to study non-statistical (more precisely, non-Poisson) fluctuations as a function of the size of rapidity interval, and it was further suggested that the 'spikes' in the rapidity fluctuations were evidence of fractal or intermittent behavior, in analogy to turbulence in fluid dynamics which is characterized by self-similar fluctuations at all scales-the absence of well defined scale of length.
Derived from text
Binomials; Fluid Dynamics; Analogies; Statistical Distributions

20040050668 University of Southern California, Los Angeles, CA
Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels
Egolfopoulos, Fokion N.; Nov. 2003; 14 pp.; In English
Contract(s)/Grant(s): F49620-02-1-0002; Proj-2308
Report No.(s): AD-A420935; AFRL-SR-AR-TR-04-0150; No Copyright; Avail: CASI; A03, Hardcopy
The dynamic behavior of laminar flames was studied for a wide range of conditions. The parameters considered included the fuel type, reactant composition, flame temperature, and combustion mode. The derived experimental data constitute a basis for partially validating the combustion chemistry for fuels ranging from hydrogen to gaseous and liquid hydrocarbons and alcohols. Emphasis was given to kinetics regimes that have not been systematically probed and/or in which current knowledge of combustion chemistry appears to be inadequate. The phenomena of ignition, propagation, and extinction were studied experimentally in the counterflow configuration. The experiments were modeled through the use of a quasi one-dimensional code and included detailed description of chemical kinetics and molecular transport. The results of this research showed that state of the art kinetics models have notable limitations in predicting flame properties even for simple molecules such as H2

and C1- C2 hydrocarbons, with these limitations being more profound for the more complex liquid hydrocarbons. It was also found that for 112 flames, uncertainties in diffusion coefficient calculations could have a greater effect on the predicted flame properties compared to kinetics.
DTIC
Flame Propagation; Flames; Fuels; Gaseous Fuels; Liquid Fuels

66
SYSTEMS ANALYSIS AND OPERATIONS RESEARCH

Includes mathematical modeling of systems; network analysis; mathematical programming; decision theory; and game theory.

20040045268 NASA Ames Research Center, Moffett Field, CA, USA
Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS)
Jones, Harry; [2003]; 17 pp.; In English; Habitation 2004, 4-7 Jan. 2004, Orlando, FL, USA
Contract(s)/Grant(s): 131-20-10-26; No Copyright; Avail: CASI; A03, Hardcopy

The ALS project plan goals are reducing cost, improving performance, and achieving flight readiness. ALS selects projects to advance the mission readiness of low cost, high performance technologies. The role of metrics is to help select good projects and report progress. The Equivalent Mass (EM) of a system is the sum of the estimated mass of the hardware, of its required materials and spares, and of the pressurized volume, power supply, and cooling system needed to support the hardware in space. EM is the total payload launch mass needed to provide and support a system. EM is directly proportional to the launch cost.
Derived from text
Technology Assessment; Life Support Systems; Life Cycle Costs; Payloads; Project Planning; Support Systems; Cooling Systems

20040047023 Maribor Univ., Maribor, Slovenia
An algorithm for the Asymmetric Traveling Salesman Problem
Brest, Janez; Zerovnik, Janez; Zumer, Viljem; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 40-45; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

In this paper we study a randomized approximate algorithm for the Asymmetric Traveling Salesman Problem (ATSP). Our heuristics is based on the well-known arbitrary insertion procedure. This algorithm was not paid too much attention, maybe because of the known worst case performance. Local optimization is a well known and widely used general purpose heuristics. In our experiment we repeatedly ran the arbitrary insertion based procedure followed by a local optimization phase. Interestingly, we got surprisingly good results within short computation times. In this paper we give results of tests of our algorithm on all ATSP instances of the TSPLIB library, which were available at the time of the experiment. The main idea of our heuristics is based on the arbitrary insertion algorithm, a relaxation of the cheapest insertion algorithm. The solutions are further improved by a local optimization phase. The rest of the paper is organized as follows. In Section 2 an overview of the ATSP and the local optimization is given. In Section 3 our heuritic algorithm is described. Some implementation details of our algorithm are presented in Section 4. Experimental results of the implemented heuristic algorithm on ATSP instances of the TSPLIB are presented in Section 5. In Section 6 conclusion remarks and some guidelines for future work are given.
Author (revised)
Asymmetry; Traveling Salesman Problem; Heuristic Methods

20040047031 Rutherford Appleton Lab., Oxford, UK
Interior-Point l1-Penality Method for Nonlinear Optimization
Gould, N. I. M.; Orban, D.; Toint, P. L.; 2003; 32 pp.; In English
Report No.(s): PB2004-104258; RAL-TR-2003-022; Copyright; Avail: National Technical Information Service (NTIS)

A mixed interior/exterior-point method for nonlinear programming is described, that handles constraints by an L1-penalty function. A suitable decomposition of the penalty terms and embedding of the problem into a higher-dimensional setting leads to an equivalent, surprisingly regular, reformulation as a smooth penalty problem only involving inequality constraints. The resulting problem may then be tackled using interior-point techniques as finding a strictly feasible initial point is trivial. The reformulation relaxes the shape of the constraints, promoting larger steps and easing the nonlinearity of the strictly feasible set in the neighbourhood of a solution. If finite multipliers exist, exactness of the penalty function eliminates the need to drive

the corresponding penalty parameter to infinity. Global and fast local convergence of the proposed scheme are established and practical aspects of the method are discussed.
NTIS
Nonlinear Programming; Optimization; Algorithms; Inequalities

20040050288 NASA Marshall Space Flight Center, Huntsville, AL, USA
Schedule Risk Assessment
Smith, Grego; March 09, 2004; 24 pp.; In English; Teh Society of Cost Estimating and Analysis (SCEA), 9 Mar. 2004, Huntsville, AL, USA; Original contains black and white illustrations
Contract(s)/Grant(s): NAS8-00187; No Copyright; Avail: CASI; A03, Hardcopy

Schedule Risk Assessment (SRA) determines the probability of finishing on or before a given point in time. This viewgraph presentation introduces the prerequisites, probability distribution curves, special conditions, calculations, and results analysis for SRA.
Author
Schedules; Risk; Assessments; Predictions

67
THEORETICAL MATHEMATICS

Includes algebra, functional analysis, geometry, topology, set theory, group theory and number theory.

20040047024 Ljubljana Univ., Ljubljana, Slovenia
Lattice Based Coding Schemes
Susnik, Rudolf; Tomazic, Saso; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 59-65; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

Symbols in every channel coding scheme can be represented by constellations demonstrating their properties when applied to the physical channel. In the recent years, numerous researches have been made in the field of lattice codes. By using them one can achieve a few dB of the coding gain. Examples of such codes are the ones proposed to enhance the physical layer properties of wireless local area networks. Channel code performances can be enhanced by adding orthogonal carriers, through constellation shaping or arranging constellation symbols. The problem of the coding gain has remained unsolved ever since the exact solution of the upper bound of the shaping gain. In this paper, the idea of lattice based coding schemes is developed. The error probability depends on the closest symbol, thus forming the need for a constellation where each symbol would have as many as possible neighbors at the same distance. This problem is known and is termed 'a sphere packing problem'. Despite the convenient mathematical representation of lattices, the problem of decoding lattice codes still remains unsolved. Several universal decoding algorithms have been proposed without ultimate success, as they display computational inefficiency. Moreover, one is also familiar with several decoding algorithms for some well-known lattices attractive for applications. Such algorithms exploit the special structure of lattices, which is the key to efficient decoding.
Author
Lattices (Mathematics); Coding; Channels (Data Transmission)

70
PHYSICS (GENERAL)

Includes general research topics related to mechanics, kinetics, magnetism, and electrodynamics. For specific areas of physics see *categories 71 through 77*. For related instrumentation see *35 Instrumentation and Photography*; for geophysics, astrophysics, or solar physics see *46 Geophysics, 90 Astrophysics*, or *92 Solar Physics*.

20040046952 Lawrence Livermore National Lab., Livermore, CA
Switchyard Enclosure Bolted Connection Calculations
Patton, B.; Sep. 10, 2001; 12 pp.; In English
Report No.(s): DE2004-15005722; UCRL-ID-145896; No Copyright; Avail: Department of Energy Information Bridge

The maximum deflection and the maximum stress were calculated for the bolted connection of the flanges. The stress is a result from both the air pressure inside the beam enclosures as well as the force from the compressed p-gasket. The results of the calculations are shown for each of the four beam enclosure types. The Safety Factor was calculated using a yield

strength of 41 ksi. Calculations were also performed on the M8 bolts that are used to connect the flanges. Both the internal air pressure and the force of the compressed p-gasket induce the normal stress. The shear stress is from the weight of the unsupported beam enclosure. The calculated maximum stresses and the resulting safety factors are given. The safety factors were calculated using the maximum shear stress hypothesis and a yield strength of 30 ksi.
NTIS
Bolted Joints; Flanges; Safety Factors

20040046966 Lawrence Livermore National Lab., Livermore, CA
TIGER LDRD
Steich, D. J.; Brugger, S. T.; Kallman, J. S.; White, D. A.; Feb. 01, 2000; 320 pp.; In English
Report No.(s): DE2004-15005658; UCRL-ID-137634; No Copyright; Avail: Department of Energy Information Bridge
This final report describes our efforts on the Three-Dimensional Massively Parallel CEM Technologies LDRD project (97-ERD-009). Significant need exists for more advanced time domain computational electromagnetics modeling. Bookkeeping details and modifying inflexible software constitute a vast majority of the effort required to address such needs. The required effort escalates rapidly as problem complexity increases. For example, hybrid meshes requiring hybrid numerics on massively parallel platforms (MPPs). This project attempts to alleviate the above limitations by investigating flexible abstractions for these numerical algorithms on MPPs using object-oriented methods, providing a programming environment insulating physics from bookkeeping. The three major design iterations during the project, known as TIGER-I to TIGER-III, are discussed. Each version of TIGER is briefly discussed along with lessons learned during the development and implementation. An Application Programming Interface (API) of the object-oriented interface for Tiger-III is included in three appendices. The three appendices contain the Utilities, Entity-Attribute, and Mesh libraries developed during the project. The API libraries represent a snapshot of our latest attempt at insulated the physics from the bookkeeping.
NTIS
Computerized Simulation; Parallel Processing (Computers); Application Programming Interface; Computational Electromagnetics

20040046971 Lawrence Livermore National Lab., Livermore, CA, USA
Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram
Lorenzana, H. E.; Lipp, M. J.; Evans, W. J.; Sep. 21, 2001; 14 pp.; In English
Report No.(s): DE2004-15004699; UCRL-JC-145350; No Copyright; Avail: Department of Energy Information Bridge
Despite their simplicity, diatomic molecules of first row elements can exhibit very complex phase diagrams. Determination of the phase diagrams can be further complicated by the existence of hysteretic molecular phases that can be observed over large regions of coexistence. Here we present evidence for a previously unreported molecular phase of nitrogen existing at room temperature at least over the range of 33-74 GPa. Our measurements show that sample history may have a significant impact on the thermodynamic states accessed by the molecular nitrogen solid and, by extension, also on the established phase diagram.
NTIS
Nitrogen; Phase Diagrams; Metastable State; Diatomic Molecules

20040046973 Maryland Univ., College Park, MD, USA, Thomas Jefferson National Accelerator Facility, Newport News, VA, USA, Florida International Univ., Miami, FL, USA, American Physical Society, New York, NY, USA
Baryon Operators and Spectroscopy in Lattice QCD
Basak, S.; Edwards, R.; Fiebig, R.; 2003; 12 pp.; In English
Report No.(s): DE2003-819583; No Copyright; Avail: Department of Energy Information Bridge
The construction of the operators and correlators required to determine the excited baryon spectrum is presented, with the aim of exploring the spatial and spin structure of the states while minimizing the number of propagator inversions. The method used to construct operators that transform irreducibly under the symmetries of the lattice is detailed, and the properties of example operators is studied using domain-wall fermion valence propagators computed on MILC asqtad dynamical lattices.
NTIS
Baryons; Correlators; Particle Spin; Spectroscopy

20040046988 Thomas Jefferson National Accelerator Facility, Newport News, VA, USA
Hadronic Multi-Particle Final State Measurements with CLAS at Jefferson Lab
Brooks, W. K.; 2003; 12 pp.; In English
Report No.(s): DE2003-816873; No Copyright; Avail: Department of Energy Information Bridge

Precision measurements in the neutrino sector are becoming increasingly feasible due to the development of relatively high-rate experimental capabilities. These important developments command renewed attention to the systematic corrections needed to interpret the data. Hadronic multi-particle final state measurements made using CLAS at Jefferson Lab, together with a broad theoretical effort that links electro-nucleus and neutrino-nucleus data, will address this problem, and will elucidate long-standing problems in intermediate energy nuclear physics. This new work will ultimately enable precision determinations of fundamental quantities such as the neutrino mixing matrix elements in detailed studies of neutrino oscillations.
NTIS
Hadrons; Particles; Measurement

20040047004 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Neutrino Factory R&D in the U.S
Zisman, M. S.; 2003; 12 pp.; In English
Report No.(s): DE2003-816792; No Copyright; Avail: Department of Energy Information Bridge
We report here on the technical progress and R&D plans of the U.S. Neutrino Factory and Muon Collider Collaboration. Programs in targetry, cooling, acceleration, and simulations are covered. U.S. activities in support of the international Muon Ionization Cooling Experiment (MICE) are also described.
NTIS
Research and Development; Muons; Neutrinos; Ionization

20040047036 Helsinki Univ. of Technology, Espoo, Finland
Helsinki University of Technology Deparment of Electrical and Communications Engineering, Electron Physics Laboratory Annual Report 2001
Storgards, J.; 2001; 38 pp.; In English
Report No.(s): PB2004-103319; Copyright; Avail: National Technical Information Service (NTIS)
Helsinki University of Technology (HUT) is the largest university for engineering education and research in Finland. It is located on a campus in Otaniemi (Espoo) on the west side of the capital, Helsinki. The university comprises of approximately 70 laboratories. The number of undergraduate and graduate students is about 14000 and has been rapidly growing in the recent years. The Electron Physics Laboratory (EPL) is one of the 20 laboratories in the Department of Electrical and Communications Engineering. The laboratory provides higher education and research in the field of modern semiconductor technology. The activities include semiconductor physics, processing and measurement technology of semiconductor devices, Integrated Circuit (IC) technology and micro sensors.
NTIS
Electrical Engineering; Semiconductors (Materials); Integrated Circuits

20040047074 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA, California Univ., Berkeley, CA, USA
Ultrafast X-Ray Science at the Advanced Light Source
Schoenlein, R. W.; Chin, A. H.; Chong, H. H. W.; Falcone, R. W.; Glover, T. E.; 2003; 20 pp.; In English
Report No.(s): DE2003-816767; No Copyright; Avail: Department of Energy Information Bridge
Our scientific understanding of the static or time-averaged structure of condensed matter on the atomic scale has been dramatically advanced by direct structural measurements using x-ray techniques and modern synchrotron sources. Of course the structure of condensed matter is not static, and to understanding the behavior of condensed matter at the most fundamental level requires structural measurements on the time scale on which atoms move. The evolution of condensed-matter structure, via the making and breaking of chemical bonds and the rearrangement of atoms, occurs on the fundamental time scale of a vibrational period, approx. 100 fs. Atomic motion and structural dynamics on this time scale ultimately determine the course of phase transitions in solids, the kinetic pathways of chemical reactions, and even the efficiency and function of biological processes. The integration of x-ray measurement techniques, a highbrightness femtosecond x-ray source, femtosecond lasers, and stroboscopic pump-probe techniques will provide the unique capability to address fundamental scientific questions in solidstate physics, chemistry, AMO physics, and biology involving structural dynamics. In this paper, we review recent work in ultrafast x-ray science at the ALS including time-resolved diffraction measurements and efforts to develop dedicated beamlines for femtosecond x-ray experiments.
NTIS
Condensed Matter Physics; X Ray Sources; Dynamic Structural Analysis; Synchrotrons

20040047082 Fermi National Accelerator Lab., Batavia, IL, USA
Beauty and Charm Physics at CDF Run II
Bishai, M.; Oct. 2003; 20 pp.; In English
Report No.(s): DE2003-816340; FERMILAB-CONF-03/310-E; No Copyright; Avail: Department of Energy Information Bridge

Using the data samples collected with the CDF Run II detector during the year 2002 and early 2003, new measurements of the production cross-sections and the masses, lifetimes and branching fractions of beauty and charm hadrons are presented. New measurements of the (Lambda) (sub b) mass, lifetime, and branching fractions have greatly improved the current knowledge of bottom baryon properties and decay dynamics. The large charm signals made available by the silicon vertex track trigger have enabled the establishment of key measurements using rare charm decays that are sensitive to new physics beyond the Standard Model. The decay signals B (sub s) (yields) D(sub s)(pi) and the two body charmless decays of B(sup 0) and B(sub s) have been established. These decay channels are important milestones towards the measurement of B (sub s) mixing and direct CP violation in the B system.
NTIS
Baryons; Actuators; CP Violation

20040047088 Lawrence Livermore National Lab., Livermore, CA
Composite Target Concept for Multi-Pulse Radiography
McCarrick, J.; Jun. 04, 2002; 10 pp.; In English
Report No.(s): DE2003-15005396; UCRL-JC-146759; No Copyright; Avail: Department of Energy Information Bridge

Multi-pulse radiographic accelerators, such as the DARHT-II facility under construction at Los Alamos National Laboratory, generate X-rays by striking a solid, high-Z 'bremsstrahlung converter target' with a tightly focused, high-current, relativistic electron beam. In the process, the converter target is heated to a plasma state and significant thermal expansion can occur during the interval between pulses, depleting the beam focus region of target material and reducing the X-ray output. Beam scatter and various other technical constraints prevent using thicker targets, moving the electron beam to a fresh target region, or moving fresh target material into a fixed beam location. The remaining possibility is to optimize the choice of target material to maximize the effective heat capacity while maintaining dose and minimizing scatter. A kinematic model of a 'composite target' of high-Z material in a low-Z matrix is presented here as a candidate for such an optimized target. The thermal destruction of the target cannot be avoided but can be slowed sufficiently to maintain the necessary output dose. Methods of manufacturing such targets, and their radiographic performance, are being tested at the ETA-II accelerator facility at Lawrence Livermore National Laboratory.
NTIS
Electron Beams; X Rays; Radiography

20040047089 Lawrence Livermore National Lab., Livermore, CA
Shock Propagation and Instability Structures in Compressed Silica Aerogels
Howard, W. M.; Molitoris, J. D.; DeHaven, M. R.; Gash, A. E.; Satcher, J. H.; May 30, 2002; 12 pp.; In English
Report No.(s): DE2003-15005397; UCRL-JC-146894; No Copyright; Avail: Department of Energy Information Bridge

We have performed a series of experiments examining shock propagation in low density aerogels. High-pressure ((approx)100 kbar) shock waves are produced by detonating high explosives. Radiography is used to obtain a time sequence imaging of the shocks as they enter and traverse the aerogel. We compress the aerogel by impinging shocks waves on either one or both sides of an aerogel slab. The shock wave initially transmitted to the aerogel is very narrow and flat, but disperses and curves as it propagates. Optical images of the shock front reveal the initial formation of a hot dense region that cools and evolves into a well-defined microstructure. Structures observed in the shock front are examined in the framework of hydrodynamic instabilities generated as the shock traverses the low-density aerogel. The primary features of shock propagation are compared to simulations, which also include modeling the detonation of the high explosive, with a 2-D Arbitrary Lagrange Eulerian hydrodynamics code The code includes a detailed thermochemical equation of state and rate law kinetics. We will present an analysis of the data from the time resolved imaging diagnostics and form a consistent picture of the shock transmission, propagation and instability structure.
NTIS
Silica Gel; Shock Waves; Shock Fronts

20040047242 Lawrence Livermore National Lab., Livermore, CA
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses
Nummally, W. C.; Krogh, M.; Williams, C.; Trimble, D.; Sampayan, S.; Jun. 03, 2003; 10 pp.; In English
Report No.(s): DE2004-15005840; UCRL-JC-151647; No Copyright; Avail: Department of Energy Information Bridge

The maximum vacuum insulator surface dielectric strength determines the acceleration electric field gradient possible in a short pulse accelerator. Previous work has indicated that higher electric field strengths along the insulator-vacuum interface might be obtained as the pulse duration is decreased. In this work, a 250 kV, single ns wide impulse source was applied to small diameter, segmented insulators samples in a vacuum to evaluate the multi-layer surface dielectric strength of the sample construction. Resonances in the low inductance test geometry were used to obtain unipolar, pulsed electric fields in excess of 100 MV/m on the insulator surface. The sample construction, experimental arrangement and experimental results are presented for the initial data in this work. Modeling of the multi-layer structure is discussed and methods of improving insulator surface dielectric strength in a vacuum are proposed.
NTIS
Electric Fields; Field Strength; Pulse Duration; Dielectrics

20040047243 Lawrence Livermore National Lab., Livermore, CA
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities
Younes, W.; Britt, H. C.; Mar. 31, 2003; 18 pp.; In English
Report No.(s): DE2004-15005842; UCRL-ID-152906; No Copyright; Avail: Department of Energy Information Bridge

Cross sections for neutron-induced fission of (sup 231, 233)Th, (sup 234,235,236,237,239)U, and (sup 240,241, 243)Pu are presented in tabular form for incident neutron energies of 0.1(le) E(sub n)(MeV)(le) 2.5. The cross sections were obtained by converting measured fission probabilities from (t,pf) reactions on mass-A targets to (n,f) cross sections on mass-A+ 1 neutron targets, by using modeling to compensate for the differences in the reaction mechanisms.
NTIS
Neutrons; Neutron Cross Sections; Plutonium Isotopes; Thorium Isotopes; Uranium Isotopes

20040047244 Lawrence Livermore National Lab., Livermore, CA
POINT 2003: A Temperature Dependent ENDF/B-VI, Release 8 Cross Section Library
Cullen, D. E.; May 22, 2003; 20 pp.; In English
Report No.(s): DE2004-15005843; UCRL-ID-127776-R2; No Copyright; Avail: Department of Energy Information Bridge

The ENDF/B data library has recently been updated and is now freely available through the National Nuclear Data Center (NNDC), Brookhaven National Laboratory. This most recent library is identified as ENDF/B-VI, Release 8. Release 8 completely supersedes all preceding releases. Release 8 will be the last release of ENDF/B-VI; the next release of ENDF/B data will be for the new ENDF/B-VII library. As distributed the ENDF/B-VI, Release 8 data includes cross sections represented in the form of a combination of resonance parameters and/or tabulated energy dependent cross sections, nominally at 0 Kelvin temperature.
NTIS
Cross Sections; Temperature Dependence

20040047253 Lawrence Livermore National Lab., Livermore, CA
Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF
Friedrich, S.; Drury, O.; Niedermayr, T.; Cunningham, M. F.; van den Berg, M. L.; Sep. 15, 2000; 18 pp.; In English
Report No.(s): DE2004-15005851; UCRL-JC-138005; No Copyright; Avail: Department of Energy Information Bridge

We have built a two-stage adiabatic demagnetization refrigerator (ADR) to operate cryogenic high-resolution x-ray detectors in synchrotron-based fluorescence applications. The detector is held at the end of a 40 cm cold finger that extends into a UHV sample chamber. The ADR attains a base temperature below 100 mK with about 24 hours hold time below 400 mK, and does not require pumping on the liquid He bath. We will discuss cryostat design and performance.
NTIS
Superconductivity; X Ray Detectors; Magnetic Fields; Magnetic Cooling

20040047254 Lawrence Livermore National Lab., Livermore, CA
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector
Lehner, C. E.; Vetter, K.; Kunh, A.; Schmid, G. J.; Beckedahl, D. A.; Oct. 25, 2001; 12 pp.; In English
Report No.(s): DE2004-15005670; UCRL-JC-143745; No Copyright; Avail: Department of Energy Information Bridge

We present position sensitivity measurements obtained with one of the 32-fold segmented HPGe detectors from Michigan State University. These measurements were performed with a collimated beam of 137Cs gamma rays scattered by 90 degrees. This deposits 374 keV at a given location inside the crystal. A position resolution can be determined over many events by examining the digitally recorded pulse shapes on the 32 electrical contacts. If position resolution is adequate, gamma ray Compton camera imaging may be possible.
NTIS
Sensitivity; Position (Location)

20040047264 Lawrence Livermore National Lab., Livermore, CA
LEOS Interpolation Package
Fritsch, F. N.; Mar. 12, 2003; 34 pp.; In English
Report No.(s): DE2004-15005830; UCRL-ID-148554-R1; No Copyright; Avail: Department of Energy Information Bridge
This report describes the interpolation package in the Livermore Equation of State (LEOS) system.
NTIS
Interpolation; Equations of State

20040050173 Lawrence Livermore National Lab., Livermore, CA
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation
Fuchs, J.; Labaune, C.; Depierreux, S.; Bandulet, H.; Michel, P.; Sep. 25, 2001; 12 pp.; In English
Report No.(s): DE2004-15005867; UCRL-JC-145527; No Copyright; Avail: Department of Energy Information Bridge
Direct measurement of the coherence time of a high-intensity laser beam (600 ps, 10(sup 14) W.cm(sup -2)) after plasma propagation is achieved using a Michelson interferometer. Through plasma of interest for indirect-drive fusion (0.1 x n(sub c), 1 mm long), a large decrease of the coherence time is observed, from 100 ps to(approx) 10 ps, induced by the interaction between the intense beam and the plasma. This decrease is even stronger as the light is scattered at larger angles from the initial beam angular distribution and as the plasma density is increased. The results coincide with trends observed in recent numerical simulations.
NTIS
Plasmas (Physics); Plasma Density; Laser Beams

20040050174 Lawrence Livermore National Lab., Livermore, CA
Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases
Ramshaw, J. D.; Sep. 11, 2003; 22 pp.; In English
Report No.(s): DE2004-15005889; UCRL-ID-155290; No Copyright; Avail: Department of Energy Information Bridge
A dynamical description of atomic mixing in multicomponent gases and plasmas was summarized in a previous report (UCRL-ID-145502). That description is based on the use of separate continuity and momentum equations for each species present, including neutral atoms, ions, and free electrons. This level of detail is not always feasible in practical problems, where subsets of species (e.g., neutral atoms of a particular element together with their ionization products) must be grouped or lumped together into composite species or materials to make the problem tractable. A simple procedure for constructing such composite species was outlined in UCRL-ID-145502, but not in sufficient detail to enable implementation. In particular, the treatment of the free electrons presents some subtleties, since they cannot be included in the composite species for dynamical purposes, whereas they are ordinarily lumped together with the atoms and ions that produced them for state equation purposes. Our purpose here is to provide a more complete description of the procedure by which composite species and their evolution equations may be defined and derived. Special attention is given to the problem of how to deal with the free electrons in a manner consistent with the different roles they play in the dynamics and thermodynamics. The results are given in a form that should be well suited for implementation in hydrodynamics codes that use conventional material state equations.
NTIS
Ionized Gases; Free Electrons; Momentum Theory; Monatomic Gases

20040050182 Lawrence Livermore National Lab., Livermore, CA
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms
Schafer, K. J.; Gaarde, M. B.; Kulander, K. C.; Sheehy, B.; DiMauro, L. F.; Mar. 15, 2000; 22 pp.; In English
Report No.(s): DE2004-15005852; UCRL-JC-138072; No Copyright; Avail: Department of Energy Information Bridge

The development of a new class of laser systems: capable of producing intense radiation in the mid-infrared (MIR) regime (photon energies between 0.3 and 0.4 eV), opens the possibility of observing multiphoton processes in a new class of systems with lower ionization potentials than those previously studied. Of particular interest are the alkali metal atoms, which are true one-(valence)-electron systems. We present theoretical calculations of above threshold ionization (ATI) and high harmonic generation (HHG) from alkali metal atoms subject to 3-4 (micron)m laser irradiation. The ATI calculations, which use a multiple gauge propagation method, show a striking dependence in the production of high-order photoelectrons on the electron-ion potential. The HHG calculations illustrate the importance of the strong ground-to-first excited state coupling in multiphoton processes in the alkali metals.
NTIS
Alkali Metals; Photons; Atoms; Photoelectrons

20040050189 Lawrence Livermore National Lab., Livermore, CA
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source
Lepson, J. K.; Beiersdorfer, P.; Brown, G. V.; Chen, H.; Gullikson, E. M.; Jan. 17, 2001; 16 pp.; In English
Report No.(s): DE2004-15006178; UCRL-ID-142264; No Copyright; Avail: Department of Energy Information Bridge
The relative instrument response function of a flat-field grating extreme ultraviolet spectrometer was determined using the ALS synchrotron source in the wavelength region 40-200(angstrom). Details of the calibration procedure and results are given in the report.
NTIS
Ultraviolet Spectrometers; Calibrating

20040050195 Lawrence Livermore National Lab., Livermore, CA
Metallization of Hydrogen and Other Small Molecules at 100 GPa Pressures
Nellis, W. J.; Aug. 17, 2002; 12 pp.; In English
Report No.(s): DE2004-15006153; UCRL-JC-145169; No Copyright; Avail: Department of Energy Information Bridge
Fluid hydrogen, oxygen, and nitrogen become metallic at 100 GPa (1 Mbar) pressures. Disorder is the primary reason for observing a metal at lower pressures in the fluid than expected for the ordered solid. This metallic transition is similar to those observed in fluid Cs and Rb by Hensel et al. All five undergo a Mott transition from a semiconducting to metallic fluid with the same electrical conductivities. In contrast, water is a proton conductor at pressures up to 200 GPa. Extreme conditions were achieved for(approx)100 ns with a reverberating shock wave generated with a two-stage light-gas gun.
NTIS
Hydrogen; Light Gas Guns; Conductivity

20040050197 Lawrence Livermore National Lab., Livermore, CA
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II)
Cohen, B. I.; Dimits, A. M.; Nevins, W. M.; Chen, Y.; Parker, S.; Oct. 11, 2001; 38 pp.; In English
Report No.(s): DE2004-15006149; UCRL-JC-142446-R1; No Copyright; Avail: Department of Energy Information Bridge
An electromagnetic hybrid scheme (fluid electrons and gyrokinetic ions) is elaborated in example calculations and extended to toroidal geometry. The scheme includes a kinetic electron closure valid for(beta)(sub e)>; m(sub e)/m(sub i) ((beta)(sub e) is the ratio of the plasma electron pressure to the magnetic field energy density). The new scheme incorporates partially linearized ((delta)f) drift-kinetic electrons whose pressure and number density moments are used to close the fluid momentum equation for the electron fluid (Ohm's law). The test cases used are small-amplitude kinetic shear-Alfven waves with electron Landau damping, the ion-temperature-gradient instability, and the collisionless drift instability (universal mode) in an unsheared slab as a function of the plasma(beta)(sub e). Attention is given to resolution and convergence issues in simulations of turbulent steady states.
NTIS
Plasma Drift; Magnetic Fields; Kinetics; Electrons; Magnetohydrodynamic Waves

20040050200 Lawrence Livermore National Lab., Livermore, CA
Why are the P(n) and S(n) Methods Equivalent
Cullen, D. E.; Sep. 19, 2001; 18 pp.; In English
Report No.(s): DE2004-15006206; UCRL-ID-145518; No Copyright; Avail: Department of Energy Information Bridge
The author assumes that the reader is familiar with the Spherical harmonics, Pn, method and the discrete ordinates, S(sub

n), method; for a derivation of the equations used in these methods. I will only discuss the Boltzmann equation in one dimension, and the Sn method using Gaussian quadrature. I will do this merely to simplify the following discussion; once you understand the concepts presented here you can easily extend the conclusions to more general situations. Why are the spherical harmonics P(sub n) and discrete ordinate S(sub n) methods, or more correctly the P(sub n) and S(sub n+1) methods, equivalent, e.g., P(sub 3) is equivalent to S(sub 4). When the S(sub n) method uses a Gaussian quadrature most textbooks will tell you that both methods are equivalent to assuming that the angular flux can be represented by a Legendre polynomial expansion of order n.
NTIS
Boltzmann Transport Equation; Numerical Analysis; Spherical Harmonics

20040050227 Lawrence Livermore National Lab., Livermore, CA
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals
Carr, C. W.; Radousky, H. B.; Staggs, M.; Rubenchik, A. M.; Feit, M. D.; Dec. 19, 2001; 12 pp.; In English
Report No.(s): DE2004-15005929; UCRL-JC-145025; No Copyright; Avail: Department of Energy Information Bridge
We have investigated the flash of light that accompanies laser damage using time-resolved spectroscopy. Damage events were initiated in the bulk of both fused silica and DKDP crystals with 355-nm 3-ns pulsed radiation. Spectra from the accompanying flash were recorded in the 200-500 nm wavelength range with 5-ns temporal resolution. Ten ns following damage initiation, the spectra were found to be roughly blackbody with temperatures on the order of 5000 K to 7000 K, depending on the material studied and excitation energy used. The observed temperatures and cooling rates can be related to the size and electron density of the plasma 'fireball' that initiates the damage event.
NTIS
Crystals; Spectroscopy; Temporal Resolution; Silicon Dioxide; Laser Damage

20040050237 Lawrence Livermore National Lab., Livermore, CA
Edge Plasma Analysis for Liquid-Wall MFE Concepts
Moir, R. W.; Rensink, M.; Rognlien, T. D.; Sep. 21, 2000; 12 pp.; In English
Report No.(s): DE2004-15006141; UCRL-JC-139740; No Copyright; Avail: Department of Energy Information Bridge
A thick flowing layer of liquid (e.g., flibe-a molten salt, or Sn(sub 80)Li(sub 20)--a liquid metal) protects the structural walls of the magnetic fusion configuration so that they can last the life of the plant even with intense 14 MeV neutron bombardment from the D-T fusion reaction. The surface temperature of the liquid rises as it passes from the inlet nozzles to the exit nozzles due to absorption of line and bremsstrahlung radiation, and neutrons. The surface temperature can be reduced by enhanced turbulent convection of hot surface liquid into the cooler interior. This surface temperature is affected by the temperature of liquid from a heat transport and energy recovery system. The evaporative flux from the wall driven by the surface temperature must also result in an acceptable impurity level in the core plasma. The shielding of the core by the edge plasma is modeled with a 2D-transport code for the DT and impurity ions; these impurity ions are either swept out to the divertor, or diffuse to the hot plasma core. An auxiliary plasma between the edge plasma and the liquid wall may further attenuate evaporating flux of atoms and molecules by ionization near the wall.
NTIS
High Temperature Plasmas; Nuclear Fusion

20040050238 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Preliminary Radiation Shielding Design for BOOMERANG
Donahue, R. J.; Jun. 11, 2003; 16 pp.; In English
Report No.(s): DE2004-820260; No Copyright; Avail: Department of Energy Information Bridge
No abstract available
Solar Radiation Shielding; Design Analysis; Illuminators

20040050260 NASA Marshall Space Flight Center, Huntsville, AL, USA
Radiation Pressure Measurements on Micron-Size Individual Dust Grains
Abbas, M. M.; Craven, P. D.; Spann, J. F.; Witherow, W. K.; West, E. A.; Gallagher, D. L.; Adrian, M. L.; Fishman, G. J.; Tankosic, D.; LeClair, A., et al.; Journal of Geophysical Research; 2003; ISSN 0148-0227; Volume 108, No. A6, pp. 2-1 - 2-10; In English
Contract(s)/Grant(s): NCC8-200; Copyright; Avail: Other Sources

Measurements of electromagnetic radiation pressure have been made on individual silica (SiO2) particles levitated in an electrodynamic balance. These measurements were made by inserting single charged particles of known diameter in the 0.2- to 6.82-micron range and irradiating them from above with laser radiation focused to beam widths of approximately 175- 400 microns at ambient pressures particle due to the radiation force is balanced by the electrostatic force indicated by the compensating dc potential applied to the balance electrodes, providing a direct measure of the radiation force on the levitated particle. Theoretical calculations of the radiation pressure with a least-squares fit to the measured data yield the radiation pressure efficiencies of the particles, and comparisons with Mie scattering theory calculations provide the imaginary part of the refractive index of SiO2 and the corresponding extinction and scattering efficiencies.
Author
Cosmic Dust; Electromagnetic Radiation; Pressure Measurement; Radiation Pressure; Silicon Dioxide; Electrodynamics

20040050280 Lockheed Martin Corp., Syracuse, NY, USA, Rensselaer Polytechnic Inst., Troy, NY, USA
Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture
Donovan, T. J.; Danon, Y.; Mar. 2002; 26 pp.; In English
Report No.(s): DE2004-820707; LM-02K012; No Copyright; Avail: Department of Energy Information Bridge

Monte Carlo algorithms are developed to calculate the ensemble-average particle leakage through the boundaries of a 2-D binary stochastic material. The mixture is specified within a rectangular area and consists of a fixed number of disks of constant radius randomly embedded in a matrix material. The algorithms are extensions of the proposal of Zimmerman et al., using chord-length sampling to eliminate the need to explicitly model the geometry of the mixture. Two variations are considered. The first algorithm uses Chord-Length Sampling (CLS) for both material regions. The second algorithm employs Limited Chord Length Sampling (LCLS), only using chord-length sampling in the matrix material. Ensemble-average leakage results are computed for a range of material interaction coefficients and compared against benchmark results for both accuracy and efficiency. both algorithms are exact for purely absorbing materials and provide decreasing accuracy as scattering is increased in the matrix material. The LCLS algorithm shows a better accuracy than the CLS algorithm for all cases while maintaining an equivalent or better efficiency. Accuracy and efficiency problems with the CLS algorithm are due principally to assumptions made in determining the chord-length distribution within the disks.
NTIS
Monte Carlo Method; Algorithms; Binary Mixtures

20040050293 Lawrence Livermore National Lab., Livermore, CA
ITER CS Model Coil and CS Insert Test Results
Martovetsky, N.; Michael, P.; Minervini, J.; Radovinsky, A.; Takayasu, M.; Sep. 07, 2000; 12 pp.; In English
Report No.(s): DE2004-15006127; UCRL-JC-140341; No Copyright; Avail: Department of Energy Information Bridge

The Inner and Outer modules of the Central Solenoid Model Coil (CSMC) were built by US and Japanese home teams in collaboration with European and Russian teams to demonstrate the feasibility of a superconducting Central Solenoid for ITER and other large tokamak reactors. The CSMC mass is about 120 t, OD is about 3.6 m and the stored energy is 640 MJ at 46 kA and peak field of 13 T. Testing of the CSMC and the CS Insert took place at Japan Atomic Energy Research Institute (JAERI) from mid March until mid August 2000. This paper presents the main results of the tests performed.
NTIS
Solenoids; Superconducting Magnets

20040050310 Fermi National Accelerator Lab., Batavia, IL, USA
CDF Silicon Vertex Detector for Run II
Rossin, R.; Jan. 2004; 14 pp.; In English
Report No.(s): DE2004-820607; FERMILAB-CONF-03/397-E; No Copyright; Avail: Department of Energy Information Bridge

The 8 layer, 720k channel CDF Run 2 silicon detector is an essential part of the heavy flavor tagging and forward tracking capabilities of the CDF experiment. A summary of the experience in commissioning and operating this double-sided detector during the first 2 years of Run 2 is presented. The performances of the silicon in term of resolution, efficiency are also described. The results of the studies of radiation damage and the expected operational limits are discussed. A short description of the SVT, the Level 2 Silicon Vertex Trigger, one of the major upgrades related to the new silicon device is also presented.

Finally, some of the many physics results achieved by means of the new Silicon+SVT machinery are also reviewed.
NTIS
Actuators; Silicon

20040050313 Fermi National Accelerator Lab., Batavia, IL, USA
Search for New Particles at CDF II
Rolli, S.; Jan. 2004; 12 pp.; In English
Report No.(s): DE2004-820686; FERMILAB-CONF-03/170-E; No Copyright; Avail: Department of Energy Information Bridge

The authors report on the first results from the CDF experiment on search for physics beyond the Standard Model using data from the upgraded TeVatron collider running p(bar p) collisions at(radical)s= 1960 GeV. These first results, although obtained with a total integrated luminosity lower than the total integrated luminosity collected during Run I, are already competitive if not better, due to the increase in the center of mass energy and the improved detector capability.
NTIS
Particle Accelerators; Collisions

20040050314 Fermi National Accelerator Lab., Batavia, IL, USA
Search for New Phenomena in CDF
Scodellaro, L.; Jan. 2004; 14 pp.; In English
Report No.(s): DE2004-820688; FERMILAB-CONF-03/192-E; No Copyright; Avail: Department of Energy Information Bridge

The authors present the most recent results and perspectives of the searches for new phenomena at the CDF experiment of the Tevatron collider.
NTIS
Particle Accelerators; Detectors

20040050322 Lawrence Livermore National Lab., Livermore, CA, USA
RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data
Ham, C. L.; Sep. 10, 2002; 54 pp.; In English
Report No.(s): DE2004-15005945; UCRL-ID-150000; No Copyright; Avail: Department of Energy Information Bridge

Neutron and gamma-ray spectrometry experiments can produce a large volume of data. At various times, these data need to be collected, annotated, collated, analyzed, transported, archived, and retrieved. In practice, these operations often occur on multiple platforms. We needed a data file format that was flexible in the type and amount of data it could store, portable across different computer platforms, and was easily extensible to accommodate new data storage requirements. Finding an existing, well-developed framework that had freely distributed pre-compiled binaries for a wide variety of platforms; was open source for compilation on other platforms; had a large, diverse user base; and available user support was a bonus which helped to reduce the complexity and time required to implement a solution. The Radiation Physics Format (RPF) spectral data file format is the result of designing a standard data file format for spectral data that meets these and other criteria. It is a self-describing binary file that is based upon the National Center for Supercomputing Applications (NCSA) Hierarchical Data format (HDF) paradigm.
NTIS
Emission Spectra; Data Storage; Supercomputers; Computer Programs

20040050325 Lawrence Livermore National Lab., Livermore, CA
KDP Impurity Data
Torres, R. A.; Oct. 25, 2001; 16 pp.; In English
Report No.(s): DE2004-15006083; UCRL-ID-146031; No Copyright; Avail: Department of Energy Information Bridge

Attached are the impurity data for 20-liter growth runs N. Zaitseva/L. Carman made in the 1996-1997 time frame for which we have both solution and crystal data. The 5 impurities added for the runs are AI(III), Cr(III), Fe(III), Mo(VI), and Sb(V). As an explanation of the tables, I report all impurity concentrations as ppb (ng/g(sub KDP)) with respect to dry KDP (even solution data.) 'MDL' stands for 'Method Detection Limit.' Nominal uncertainties are 1 MDL or 10% of the quoted value, whichever is greater. If the measured value is less than the MDL, I report 'ND,' for 'Not Detected.' If the value is greater than the MDL, but less than twice the MDL, I report 'D,' for 'Detected.' If the value is more than twice the MDL,

I report two significant figures. The values come from ICP-ES and ICP-MS measurements. I give the detection limit for the more sensitive technique in the table under the 'MDL' heading. In case where only one technique was used, I give the MDL for that technique in parentheses after the impurity value in the table. Since these measurements were made, changes in instrumentation have resulted in significant improvements in many of the detection limits. Unfortunately, we no longer have any of the KDP boules from this time period. We now are concentrating on deuterated KDP, which we cannot send to you. I also am not able to locate any database of absorption spectra, which correspond to the impurity measurements for the attached data.
NTIS
Crystals; Deuterium Compounds

20040050348 Thomas Jefferson National Accelerator Facility, Newport News, VA, USA
Low and Intermediate Beta Cavity Design-A Tutorial
Delayen, J. R.; 2003; 14 pp.; In English
Report No.(s): DE2004-820178; No Copyright; Avail: Department of Energy Information Bridge
The design of low-velocity superconducting structures has been an active area of the superconducting rf (srf) technology for more than 3 decades. More recently, with the growing interest in medium-energy ion and proton accelerators, a sustained world-wide effort has been directed toward the development of the superconducting structures for the intermediate velocity region. In this tutorial we address the design issues that are specific to low- and medium-velocity superconducting cavities. Simple electrostatic and electrodynamic models based on transmission lines are presented, and scaling laws are derived.
NTIS
Superconductivity; Cavities

20040050357 Lawrence Livermore National Lab., Livermore, CA
Completeness Criterion in Atomic Modeling
Liedahl, D.; Apr. 03, 2000; 14 pp.; In English
Report No.(s): DE2004-15005857; UCRL-JC-139120; No Copyright; Avail: Department of Energy Information Bridge
The author discusses two variations on the completeness theme in atomic modeling: missing lines as they affect the performance of spectral synthesis codes, and missing configurations as they affect the theoretical emissivities of bright lines, with emphasis on the latter. It is shown that the detrimental effects of working with incomplete atomic models can overshadow those brought about by working with less-than-perfect atomic rates. Atomic models can be brought up to an acceptable level of completeness in a fairly straightforward manner, and on a reasonably short timescale, whereas the long-term goal of comprehensive accuracy is unlikely to be reached on the timescale of the current generation of X-ray observatories. A near-term, albeit imperfect, solution is to hybridize atomic models used to synthesize spectra.
NTIS
Atomic Spectra; Emissivity; Line Spectra

20040050364 Radiation Monitoring Devices, Inc., Watertown, MA, USA
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection
Entine, G.; Shah, K. S.; Cirignano, L.; Glodo, J.; Van Loef, E. V.; Dec. 2003; 10 pp.; In English
Report No.(s): DE2004-820558; No Copyright; Avail: Department of Energy Information Bridge
In radiation detection systems employing scintillation crystals for the detection of high-energy particles such as x-rays or neutrons, the scintillator often limits the performance of the system. Ideally, a scintillator should have a high light yield for good energy and position resolution, a fast response time for good time resolution and high density and atomic number Z for efficient x-ray detection. The latter property is of less importance in the case of (thermal) neutron detection. Obviously, there are many other criteria such as transparancy of the material to its own emission, ease of crystal growth, etc. However, there is no commercially available material that meets all these criteria and the choice for a particular scintillator is often a compromise among these and other factors.
NTIS
Gamma Rays; Scintillation Counters; Detection; Thermal Neutrons; Radiation Measurement

20040050370 Lawrence Livermore National Lab., Livermore, CA
NLC Interaction Region Layout and Background Estimates
Gronberg, J.; Hertzbach, S. S.; Keller, L.; Markiewicz, T.; Maruyama, T.; Feb. 01, 2001; 12 pp.; In English
Report No.(s): DE2004-15006294; UCRL-JC-142271; No Copyright; Avail: Department of Energy Information Bridge

The design of the final focus system has been modified since the previous LC workshop in Sitges. The system has a reduced length and the front face of the final focusing quadrupole has been moved back to 4.3 meters from the interaction point. We report the effect of these changes on detector backgrounds.
NTIS
Quadrupoles; Layouts; Estimates

20040050405 Rensselaer Polytechnic Inst., Troy, NY, USA, Lockheed Martin Corp., Syracuse, NY, USA
Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture
Donovan, T. J.; Sutton, T. M.; Danon, Y.; Nov. 2002; 18 pp.; In English
Report No.(s): DE2004-820722; LM-02K132; No Copyright; Avail: Department of Energy Information Bridge

Neutron transport through a special case stochastic mixture is examined, in which spheres of constant radius are uniformly mixed in a matrix material. A Monte Carlo algorithm previously proposed and examined in 2-D has been implemented in a test version of MCNP. The Limited Chord Length Sampling (LCLS) technique provides a means for modeling a binary stochastic mixture as a cell in MCNP. When inside a matrix cell, LCLS uses chord-length sampling to sample the distance to the next stochastic sphere. After a surface crossing into a stochastic sphere, transport is treated explicitly until the particle exits or is killed. Results were computed for a simple model with two different fixed neutron source distributions and three sets of material number densities. Stochastic spheres were modeled as black absorbers and varying degrees of scattering were introduced in the matrix material. Tallies were computed using the LCLS capability and by averaging results obtained from multiple realizations of the random geometry. Results were compared for accuracy and figures of merit were compared to indicate the efficiency gain of the LCLS method over the benchmark method. Results show that LCLS provides very good accuracy if the scattering optical thickness of the matrix is small ((le) 1). Comparisons of figures of merit show an advantage to LCLS varying between factors of 141 and 5. LCLS efficiency and accuracy relative to the benchmark both decrease as scattering is increased in the matrix.
NTIS
Stochastic Processes; Binary Mixtures; Monte Carlo Method

20040050407 Department of Energy, Washington, DC
Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals
Goode, S. R.; Angel, S. M.; Jan. 2004; 14 pp.; In English
Report No.(s): DE2004-820946; No Copyright; Avail: Department of Energy Information Bridge

The goals of the project are to: Develop a fiber-optic imaging probe for microanalysis of solid samples; Design a time-resolved plasma imaging system to measure the development of the LIBS signal; Setup a laboratory system capable of timing two lasers independently, for optimizing and characterizing dual-pulse LIBS; Compare the development of laser-induced plasmas generated with a single laser pulse to the development of laser-induced plasmas generated with a pre-ablation spark prior to sample ablation; Examine the effect of sample matrix on the LIBS signals of elements in different sample matrices; Investigate the effect of excitation wavelength of the ablation beam in pre-ablation spark dual-pulse LIBS experiments; Determine the effect of the physical properties of the sample on the mass of materials ablated.
NTIS
Laser-Induced Breakdown Spectroscopy; Microanalysis; Spectroscopy

20040050613 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV
Matsuta, K.; Fukuda, S.; Izumikawa, T.; Tanigaki, M.; Fukuda, M.; Nakazato, M.; Mihara, M.; Onishi, T.; Yamaguchi, T.; Miyake, T., et al.; September 1994; 9 pp.; In English
Contract(s)/Grant(s): DE-AC03-76SF-00098; NGT-50783
Report No.(s): LBL-36299; UC-413; No Copyright; Avail: CASI; A02, Hardcopy

Spin polarization of beta-emitting fragment Mg-23(I(sup pi) = 3/2(sup +), T(sub 1/2 = 11.3 s) produced through the projectile fragmentation process in Mg-24 + Au, Cu and Al collisions has been observed at 91 AMeV. General trend in the observed momentum dependence of polarization is reproduced well qualitatively by a simple fragmentation model based on the participant-spectator picture, for heavy and light targets. However the polarization behavior differs from this model in tern

of zero crossing momentum, which become prominent in the case of Cu target, where the polarization is not monotone function of the fragment momentum.
Author
Spin; Polarization (Charge Separation); Collisions; Aluminum; Copper; Silver; Magnesium Isotopes

20040050734 Texas Technological Univ., Lubbock, TX
Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance
McKenna, Gregory B.; Simon, Sindee L.; Nov. 2003; 35 pp.; In English
Contract(s)/Grant(s): F49620-01-1-0079
Report No.(s): AD-A421039; AFRL-SR-AR-TR-04-0152; No Copyright; Avail: CASI; A03, Hardcopy

We extended a previous model due to the PIs for the evolution of the properties of curing thermoset resins to the BMI/SOC resins of interest to the Air Force. The model was used to estimate the cure stresses in this system in an ideally and isotropically constrained system. The results were surprising in the large magnitude of the stresses predicted and showed that judicious selection of polymer materials for low values of the then%al pressure coefficient will reduce thermal stresses by as much as a factor of three. Also, two distinct methods for measuring isotropic residual stresses were developed and demonstrated. A spherical 'bomb' geometry was developed and provided a method of measuring isotropic stresses during cure when stresses remained below approximately 35 MPa. A thick-willed cylindrical geometry combined with lock-in amplifier electronics to excite the strain gages was developed for high stress measurements%- pressures as high as 300 MPa were readily achieved, which is not possible with conventional thin- walled cylinders or with the thin-walled sphere just mentioned. More importantly, in the process of developing the thick-walled cylinder method, we demonstrated that the classical thin-walled tube method of constraining resins in an isotropic state of stress does not actually produce the isotropy expected. Measurements tend to be incorrect and are biased by the fact that the stresses are anisotropic. Hence, the thick-walled cylinder is a true improvement in measurement technology. Using this geometry, we performed the entire cure and post-cure under compression and observed over two hundred MPa cure stresses for model thermosetting resinsconsistent with our model predictions. Our work leads us to conclude that reduction of isotropic residual stresses in them%osetting composites must focus on the reduction of thermal stresses through a reduction in the thermal pressure coefficient rather than focusing on reducing cure shrinkage.
DTIC
Performance Prediction; Plastics; Residual Stress; Thermosetting Resins

20040050741 Arizona State Univ., Tempe, AZ
Pulsed-Sound Measurements of the Influence of High- Amplitude Noise on Boundary-Layer Transition to Turbulence
Saric, William S.; Mar. 2004; 117 pp.; In English
Contract(s)/Grant(s): F49620-00-1-0075
Report No.(s): AD-A421047; XAA-0089/TE; AFRL-SR-AR-TR-04-0168; No Copyright; Avail: CASI; A06, Hardcopy

An experimental study of leading-edge receptivity to high-amplitude acoustic forcing was conducted in the low-turbulence Arizona State University Unsteady Wind Tunnel. The experiment examined unstable wave evolution in a Blasius boundary layer produced on a flat plate. A pulsed-sound technique was employed to generate Measurements of receptivity coefficients for a 20:1 modified-super-ellipse leading edge. The leading-edge profile ensures that there is no curvature discontinuity at the flat-plate juncture, therefore limiting the receptivity sources. The goal of the pulsed-sound method was to prevent the superposition of the Stokes and Tollmien- Schlichting (T-S) waves that were prevalent in previous experiments. Separation was achieved via a short acoustic pulse, followed by the conditional sampling of the boundary layer. The resulting signal yielded a pure T-S wave. The signals were examined in the frequency domain, where the magnitudes of the ensemble-averaged Fourier coefficients were used to calculate the receptivity coefficients. These experiments resolved the erroneous narrow pass-band response of all other experiments, extended the measurement range of previous experiments, and provided very good validation of analytical and numerical models. Results revealed good agreement with linear stability theory. Receptivity coefficients are presented and the first step to a transition prediction scheme has been completed.
DTIC
Acoustic Measurement; Boundary Layer Transition; Turbulence

71
ACOUSTICS

Includes sound generation, transmission, and attenuation. For noise pollution see *45 Environment Pollution*. For aircraft noise see also *02 Aerodynamics* and *07 Aircraft Propulsion and Power*.

20040046928 NASA Langley Research Center, Hampton, VA, USA
Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves
Danehy, Paul M.; Alderfer, David W.; [2004]; 8 pp.; In English; International Symposium on Interdisciplinary Shock Wave Research, 22-24 Mar. 2004, Sendai, Japan
Contract(s)/Grant(s): 23-762-45-MA; No Copyright; Avail: CASI; A02, Hardcopy

Several optical methods for measuring temperature near underwater shock waves are reviewed and compared. The relative merits of the different techniques are compared, considering accuracy, precision, ease of use, applicable temperature range, maturity, spatial resolution, and whether or not special additives are required.
Author
Shock Waves; Temperature Measurement; Optical Control; Underwater Tests

20040047008 Swedish Defence Research Establishment, Stockholm, Sweden
Modeling of Low-Frequency Sound Propagation in the Baltic
Andersson, B. L.; Karasalo, I.; Jun. 2003; In English
Report No.(s): PB2004-102188; FOI-R-0875-SE; Copyright; Avail: National Technical Information Service (NTIS)

Geoacoustic inversion techniques are applied on transmission loss (TL) data recorded in an area east of Gotland, to investigate how well the experimental data can be reproduced by a numerical model. The data were recorded during the BAROC field trials performed by FOI and FWG in May 2002. The seabed parameters were estimated by minimizing the difference between simulated and experimental data with a genetic algorithm, using the parabolic wave equation as wave propagation model.
NTIS
Mathematical Models; Genetic Algorithms; Low Frequencies

20040050399 NASA Glenn Research Center, Cleveland, OH, USA
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators
Daniels, Christopher; Finkbeiner, Joshua; Steinetz, Bruce; Li, Xiaofan; Raman, Ganesh; February 2004; 14 pp.; In English; 42nd Aerospace Sciences Meeting and Exhibit, 5-8 Jan. 2004, Reno, NV, USA
Contract(s)/Grant(s): WBS 22-708-28-15
Report No.(s): NASA/TM-2004-212902; AIAA Paper 2004-0677; NAS 1.15:212902; E-14325; No Copyright; Avail: CASI; A03, Hardcopy

A dissonant acoustic resonator with a conical shaped cavity was tested in four configurations: (A) baseline resonator with closed ends and no blockage; (B) closed resonator with internal blockage; (C) ventilated resonator with no blockage; and (D) ventilated resonator with an applied pressure differential. These tests were conducted to investigate the effects of blockage and ventilation holes on dynamic pressurization. Additionally, the investigation was to determine the ability of acoustic pressurization to impede flow through the resonator. In each of the configurations studied, the entire resonator was oscillated at the gas resonant frequency while dynamic pressure, static pressure, and temperature of the fluid were measured. In the final configuration, flow through the resonator was recorded for three oscillation conditions. Ambient condition air was used as the working fluid. The baseline results showed a marked reduction in the amplitude of the dynamic pressure waveforms over previously published studies due to the use of air instead of refrigerant as the working fluid. A change in the resonant frequency was recorded when blockages of differing geometries were used in the closed resonator, while acoustic pressure amplitudes were reduced from baseline measurements. A sharp reduction in the amplitude of the acoustic pressure waves was expected and recorded when ventilation ports were added. With elevated pressure applied to one end of the resonator, flow was reduced by oscillating the cavity at the fluid fundamental resonant frequency compared to cases without oscillation and oscillation off-resonance.
Author
Gas Flow; Nonlinearity; Oscillations; Acoustics; Cavity Resonators; Resonant Frequencies; Conical Bodies

72
ATOMIC AND MOLECULAR PHYSICS

Includes atomic and molecular structure, electron properties, and atomic and molecular spectra. For elementary particle physics see *73 Nuclear Physics*.

20040050290 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Magnetic Moment of Proton Drip-Line Nucleus (9)C
Matsuta, K.; Fukuda, M.; Tanigaki, M.; Minamisono, T.; Nojiri, Y.; Mihara, M.; Onishi, T.; Yamaguchi, T.; Harada, A.; Sasaki, M., et al.; October 1994; 7 pp.; In English
Contract(s)/Grant(s): NGT-50783
Report No.(s): LBL-36608; UC-413; Copyright; Avail: CASI; A02, Hardcopy

The magnetic moment of the proton drip-line nucleus C-9(I(sup (pi)) = 3/2, T(sub 1/2) = 126 ms) has been measured for the first time, using the beta-NMR detection technique with polarized radioactive beams. The measure value for the magnetic moment is 1mu(C-9)! = 1.3914 +/- 0.0005 (mu)N. The deduced spin expectation value <sigma> of 1.44 is unusually larger than any other ones of even-odd nuclei.
Author
Magnetic Moments; Protons; Carbon Isotopes

20040050551 NASA Marshall Space Flight Center, Huntsville, AL, USA
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model
Dobson, Chris C.; Hrbud, Ivana; [2004]; 15 pp.; In English; No Copyright; Avail: CASI; A03, Hardcopy

Electron density measurements have been made in steady-state plasmas in a spherical inertial electrostatic confinement (IEC) discharge using microwave interferometry. Plasma cores interior to two cathodes, having diameters of 15 and 23 cm, respectively, were probed over a transverse range of 10 cm with a spatial resolution of about 1.4 cm for buffer gas pressures from 0.2 to 6 Pa in argon and deuterium. The transverse profiles are generally flat, in some cases with eccentric symmetric minima, and give mean densities of from approx. = 0.4 to 7x 10(exp 10)/cu cm, the density generally increasing with the neutral gas pressure. Numerical solutions of the 1-D Poisson equation for EC plasmas are reviewed and energy distribution functions are identified which give flat transverse profiles. These functions are used with the plasma approximation to obtain solutions which also give densities consistent with the measurements, and a double potential well solution is obtained which has minima qualitatively similar to those observed. Explicit consideration is given to the compatibility of the solutions interior and exterior to the cathode, and to grid transparency. Deuterium fusion neutron emission rates were also measured and found to be isotropic, to within the measurement error, over two simultaneous directions. Anisotropy was observed in residual emissions during operation with non-fusing hydrogen-1. The deuterium rates are consistent with predictions from the model.
Author
Electron Density (Concentration); Neutron Emission; Density Measurement; Steady State; Plasmas (Physics); Electrostatics; Spherical Plasmas

20040050810 Uniformed Services Univ. of the Health Sciences, Bethesda, MD
Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard
Kimm, Gregory L.; May 16, 2002; 47 pp.; In English
Report No.(s): AD-A421145; No Copyright; Avail: CASI; A03, Hardcopy

A field expedient analytical method for detecting the chemical warfare agent (CWA) sulfur mustard as a soil contaminant was developed using solid phase microextraction (SPME) and gas chromatography/mass spectrometry (GC/MS). Five commercially available SPME fibers were investigated to determine the optimal fiber and extraction conditions. Polyacrylate and carbowax/divinylbenzene fiber coatings gave a statistically indistinguishable and best response compared to the other three types examined in a simple system studied without soil. The polyacrylate fiber coating was selected for study of a system in which sulfur mustard was spiked to an agricultural soil (standard reference material 2709, San Joaquin type). With soil samples, the greatest sensitivity occurred by the addition of deionized water to spiked soil and extraction at ambient temperature for twenty minutes or longer. SPME sampling with GC/MS analyses afforded good reproducibility (relative standard deviation between 2 to 10 %). Analyte concentrations as low as 237 ng g-1 were detected in soil (total ion

chromatograms) with this technique. The total time for sampling and analysis was under 1 hour, and the use of organic solvents or special sample introduction equipment was not needed.
DTIC
Chemical Warfare; Detection; Gas Chromatography; Mass Spectroscopy; Solid Phases; Sulfur

73
NUCLEAR PHYSICS

Includes nuclear particles; and reactor theory. For space radiation see *93 Space Radiation*. For atomic and molecular physics see *72 Atomic and Molecular Physics*. For elementary particle physics see *77 Physics of Elementary Particles and Fields*. For nuclear astrophysics see *90 Astrophysics*.

20040047081 Lawrence Livermore National Lab., Livermore, CA
Novel Parallel Numerical Methods for Radiation & Neutron Transport
Brown, P. N.; Mar. 06, 2001; 16 pp.; In English
Report No.(s): DE2003-15005562; UCRL-ID-142830; No Copyright; Avail: Department of Energy Information Bridge

In many of the multiphysics simulations performed at LLNL, transport calculations can take up 30 to 50% of the total run time. If Monte Carlo methods are used, the percentage can be as high as 80%. Thus, a significant core competence in the formulation, software implementation, and solution of the numerical problems arising in transport modeling is essential to Laboratory and DOE research. In this project, we worked on developing scalable solution methods for the equations that model the transport of photons and neutrons through materials. Our goal was to reduce the transport solve time in these simulations by means of more advanced numerical methods and their parallel implementations. These methods must be scalable, that is, the time to solution must remain constant as the problem size grows and additional computer resources are used. For iterative methods, scalability requires that (1) the number of iterations to reach convergence is independent of problem size, and (2) that the computational cost grows linearly with problem size. We focused on deterministic approaches to transport, building on our earlier work in which we performed a new, detailed analysis of some existing transport methods and developed new approaches. The Boltzmann equation (the underlying equation to be solved) and various solution methods have been developed over many years. Consequently, many laboratory codes are based on these methods, which are in some cases decades old. For the transport of x-rays through partially ionized plasmas in local thermodynamic equilibrium, the transport equation is coupled to nonlinear diffusion equations for the electron and ion temperatures via the highly nonlinear Planck function. We investigated the suitability of traditional-solution approaches to transport on terascale architectures and also designed new scalable algorithms; in some cases, we investigated hybrid approaches that combined both.
NTIS
Neutrons; Algorithms; Transport Theory

20040050326 Lawrence Livermore National Lab., Livermore, CA
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment
Dietrich, F. S.; Hartouni, E. P.; Schmid, G. J.; Soltz, R.; Abfalterer, W. P.; 2003; 10 pp.; In English
Report No.(s): DE2004-15006114; No Copyright; Avail: Department of Energy Information Bridge

We have measured proton reaction cross sections over a wide mass and energy range at the Brookhaven AGS accelerator. The samples were elemental Be, C, Al, Cu, W, and Pb; the measurements were carried out at ten incident proton kinetic energies in the range 0.54 to 7. 8 GeV. The experiment was similar to an earlier experiment in the 200-550 MeV range by Renberg et al. The new results are in good agreement with those of Renberg et al. at the overlap point near 550 MeV. The combined results of the two experiments show an energy dependence expected from the behavior of the nucleon-nucleon cross sections. The results are reproduced by calculations based on variants of the impulse approximation and Glauber theory.
NTIS
Nuclear Physics; Particle Accelerators; Nucleon-Nucleon Interactions; Electric Potential

20040050362 Lawrence Livermore National Lab., Livermore, CA
Extensions of the Direct-Semidirect Model for Calculating the High Energy Component of Fast-Nucleon Induced Gamma Spectra
Dietrich, F. S.; May 22, 2000; 18 pp.; In English
Report No.(s): DE2004-15006436; UCRL-ID-139090; No Copyright; Avail: Department of Energy Information Bridge

This section reviews extensions and variations of the direct-semidirect (DSD) model for understanding the high-energy

component of gamma spectra resulting from radiative capture of fast nucleons; i.e., the part of the spectrum that is not amenable to standard statistical model (Hauser-Feshbach) treatments. We describe recent results on the extension of the DSD model to unbound final states, including comparison with proton and neutron capture data. The importance of including convective-current magnetic radiation to explain proton capture angular distributions in the 30 MeV region is shown. We conclude with a brief discussion of a model closely related to the DSD, the pure-resonance model.
NTIS
Gamma Ray Spectra; Nucleons

74
OPTICS

Includes light phenomena and the theory of optical devices; for specific optical devices see also *35 Instrumentation and Photography*. For lasers see *36 Lasers and Masers*.

20040046893 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources
Oliversen, Ronald J., Technical Monitor; Brickhouse, Nancy; March 2004; 7 pp.; In English
Contract(s)/Grant(s): NAG5-3559; No Copyright; Avail: CASI; A02, Hardcopy

Astrophysical Plasma Emission Database - APED consists of atomic data, primarily theoretical, needed to calculate X-ray through optical emission spectra of hot thermal plasmas. These data are supplemented by experimental values, such as laboratory plasma wave- lengths, and are validated by experiment only rarely. Thus the comparison of predicted spectra to astrophysical spectra serves as invaluable feedback on the quality of the models. Following up on unfavorable comparisons, we have communicated atomic data needs to atomic theorists and experimental plasma physicists so that improvements can be made to the database. The database is now reasonably complete from approx. 1 to 30 A, and from - 90 to 180 A, with significant gaps remaining in the range 30 to 90 A. Astrophysical Plasma Emission Code - APEC uses the APED data as inputs and computes level populations and line emissivities using a rate matrix solver. Tabulated models for a fine grid of temperatures and densities can be applied to observational data. The current public version of APEC output uses an input ionization balance model, assuming CIE; however, we have a working version to calculate the ionization state of the gas. We will begin testing non-equilibrium ionization (NEI) models over the next year - we are now finalizing the atomic database needed to perform the ionization state calculations. At that time, the code will be made public. We have developed optimized error codes, additional testing protocols and substantial documentation, in preparation for this public release. Secondarily, we have begun to investigate the use of APED and APEC for X-ray photoionized plasma, beginning with opacity modeling (e.g. warm absorbers). Application to bright AGN Chandra grating spectra suggests that the accurate wavelengths in APED are of great importance to fitting the data. We are exploring additional subroutines to APEC to extend its usefulness for X-ray photoionized plasma, e.g. to include collisional or photo-excitation of metastable levels for absorption.
Derived from text
Spectroscopy; High Temperature Plasmas; Optical Materials; Thin Plates; X Rays; Photoionization

20040046961 Lawrence Livermore National Lab., Livermore, CA
Mechanical Engineering Safety Note - PEPC Spreader Bar Assembly
Mason, D.; Aug. 26, 2001; 50 pp.; In English
Report No.(s): DE2004-15005720; UCRL-ID-145895; No Copyright; Avail: Department of Energy Information Bridge

The PEPC Spreader Bar Assembly consists of a spreader bar that will be attached to the PEPC Cell Housing or the Midplane Transportation Fixture during operation. While in use in the OAB (Optics Assembly Building), the Spreader Bar Assembly will be manipulated by the NOID (New Optics Insertion Device). The other critical components of the assembly are the three angular contact bearing swivels that attach the spreader bar to the lifting mechanism and the corner clamps which are used to capture the Cell Housing.
NTIS
Mechanical Engineering; Fixtures

20040046967 Lawrence Livermore National Lab., Livermore, CA
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts
Dane, C. B.; Hackel, L.; Honig, J.; Halpin, J.; Chen, H. L.; Feb. 16, 2001; 60 pp.; In English
Report No.(s): DE2004-15005707; UCRL-ID-142507; No Copyright; Avail: Department of Energy Information Bridge

The Lasershots Marking System uses laser pulses to safely and permanently impress identification markings on metal components. This process does not remove material or change surface chemistry and actually increases the marked area's resistance to fatigue and corrosion failure. Lasershots marking is ideally suited for marking parts used in situations where safety is critical-from hip-joint replacements to commercial airliner components. The minimum size of the mark is limited only by the resolution of the reading system, allowing manufacturers to mark parts which, up to now, have been too small to label with mechanical peening techniques. The high resolution of the Lasershots marks makes them difficult to reproduce, providing a solution to the ongoing problem of inferior, counterfeited parts. The high marking rate of up to six marks per second makes this system practical and cost-effective for marking high-volume components.
NTIS
Pulsed Lasers; Chemical Reactions; Marking

20040046969 Lawrence Livermore National Lab., Livermore, CA
PEPC LRU: Ball Support Assembly
Alger, T.; May 14, 1999; 78 pp.; In English
Report No.(s): DE2004-15005719; UCRL-ID-145876; No Copyright; Avail: Department of Energy Information Bridge
The PEPC LRU upper ball support assembly consists of a ball and a pneumatic air cylinder/conical seat latching mechanism to be attached to the optics support frame, and a ball attached to the PEPC LRU. Both components are designed to allow manual positioning in three axes. Upon insertion of the PEPC LRU into the structure, the upper pneumatic cylinder is actuated to latch the two assemblies together through the conical seat device to grab the lower ball to support the LRU weight. To be conservative, the design load for the assembly is 1500 pounds (the prototype PEPC LRU weight was measured to be near 1380 pounds).
NTIS
Positioning; Prototypes; Cylinders; Supports

20040046972 Lawrence Livermore National Lab., Livermore, CA
Multi-Kilovolt X-Ray Conversion Efficiencies
Back, C. A.; Davis, J. L.; Grun, J.; Landen, O. L.; Miller, M. C.; Aug. 23, 2001; 16 pp.; In English
Report No.(s): DE2004-15001981; UCRL-JC-145192; No Copyright; Avail: Department of Energy Information Bridge
X-ray sources in the 3-7 keV energy regime can be produced by laser-irradiating mid- and high-Z gas-filled targets with high-powered lasers. A series of experiments have been performed using underdense targets that are supersonically heated with (approx) 35 kJ of 0.35 (micro)m laser light. These targets were cylindrical Be enclosures that were filled with 1-2 atms of Xe or Ar gas. L-shell x-ray emission is emitted from the plasma and detected by Bragg crystal spectrometers and x-ray diodes. Absolute flux measurements show conversion efficiencies of (approx) 10% in the multi-kilovolt x-ray emission. These sources can be used as bright x-ray backlighters or for material testing.
NTIS
Laser Targets; X Ray Sources; Cylindrical Bodies

20040047009 Princeton Univ., NJ
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser
Gentile, C. A.; Parsells, R.; Butler, J. E.; Sethian, J. D.; Ciebiera, L.; Nov. 2003; 12 pp.; In English
Report No.(s): DE2004-820126; PPPL-3900; No Copyright; Avail: Department of Energy Information Bridge
In support of Inertial Fusion Energy (IFE), a 150(micro)m thick silicon (Si) wafer coated on one side with a 1.2(micro)m nanocrystalline diamond foil is being fabricated as an electron beam transmission (hibachi) window for use in KrF lasers. The hibachi window separates the lasing medium from the electron beam source while allowing the electron beam to pass through. The hibachi window must be capable of withstanding the challenging environment presented in the lasing chamber, which include: fluorine gas, delta pressure > 2 atm at 5 Hz, and a high heat flux due to the transmission of electrons passing through the foil. Tests at NRL/Electra and at PPPL have shown that a device employing these novel components in the stated configuration provide for a robust hibachi window with structural integrity.
NTIS
Inertial Confinement Fusion; Electron Beams

20040047014 Lawrence Livermore National Lab., Livermore, CA
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors
Friedrich, S.; Hiller, L. J.; Cunningham, M. F.; Labov, S. E.; Sep. 18, 2000; 12 pp.; In English
Report No.(s): DE2004-15005758; UCRL-JC-137819; No Copyright; Avail: Department of Energy Information Bridge

We have developed high-resolution Nb-Al-AlOx-Al-Nb tunnel junction extreme ultra-violet (EUV) detectors. In the energy range between 25 and 70 eV, we have measured an energy resolution of 2.2 eV full-width at half maximum (FWHM). The energy resolution degrades significantly in the energy range between (approx)80 and (approx)230 eV where the Nb absorber is partially transparent and some of the photons are absorbed in the Al trap layers. We have for the first time observed a distinctly different response for photons absorbed in the Nb and the Al layer of the same junction electrode. We have modeled this effect with Monte-Carlo simulations of the charge generation process in superconducting multilayers.
NTIS
Extreme Ultraviolet Radiation; Ultraviolet Detectors; Superconductivity

20040047121 Research and Technology Organization, Neuilly-sur-Seine, France
Optics Microwave Interactions
April 2003; 170 pp.; In English; Optics Microwave Interactions, 2-3 Sep. 2002, Jouy en Josas, France; See also 20040047122 - 20040047132; Original contains color and black and white illustrations
Report No.(s): RTO-EN-028; AC/323(SET-058)TP/42; Copyright; Avail: CASI; C01, CD-ROM; A08, Hardcopy

The following reports were processed for inclusion into the NA&SD database:Microwave Photonics in Dual-Use Military Systems - A Personal Perspective; Optoelectronic Components and Integrated Circuits Including Up and Down Conversion; Technique and Hybrid Integration Technology; Optoelectronic Components and Integration Devices: From Concepts to Applications; Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems; RF Photonics for Beamforming and Array Applications; Optical Architectures for Signal Processing: Part A; Optical Architectures for Signal Processing: Part B; Opto-Microwave Signal Processing: Up and Down Conversion Techniques; Fiber Optic Distribution Networks for Military Applications; Novel Microwave Photonic Techniques in the Future Military Systems; and Optical Beamforming Networks for Radars and Electronic Warfare Applications.
Derived from text
Photonics; Broadband; Electro-Optics

20040047123 Drexel Univ., Philadelphia, PA, USA
Novel Microwave Photonic Techniques in the Future Military Systems
Daryoush, Afshin S.; Optics Microwave Interactions; April 2003, pp. 8-1 - 8-17; In English; See also 20040047121; Copyright; Avail: CASI; A03, Hardcopy

This paper reviews a number of novel applications of microwave photonic techniques in future military systems. One category is light interactions with microwave devices and circuits, which has contributed to the beginning of microwave photonics. The performance of HBT is the most attractive over FET and HEMT devices, due to its I-V dependence on high bandwidth and optical sensitivity. Moreover, different techniques of optical ADC are reviewed and among them all-optical ADC has the greatest promise of achieving high bit resolution. Microwave spectroscopy of biological tissues provides opportunity to create tomographic images of brain and breast, which leads to low-cost and reliable health monitoring of military personnel. A higher spatial resolution is obtained when a higher modulating frequency is employed. Finally, a new microchip laser is developed to generate frequency agile sources at microwave photonics. Optical sources operating at a fixed temperature will correspond to a beat signal, where a low phase noise beat signal is produced.
Author
Microwave Equipment; Optical Communication; Photonics

20040047124 Centre National de la Recherche Scientifique, Grenoble, France
Optical Architectures for Signal Processing, Part A
Cabon, B.; Optics Microwave Interactions; April 2003, pp. 5A-1 - 5A-9; In English; See also 20040047121; Copyright; Avail: CASI; A02, Hardcopy

The progress achieved in performing optoelectronic components makes feasible the generation of microwave functions using all-optical devices. In the first part of this presentation, the principle of microwave filtering using optical interferometers is described for both optical coherent and non-coherent regimes. Optical components are addressed in terms of microwave-optical S parameters. The experimental realization of filters using fibers or integrated optics is explained. In the second part, the use of optoelectronic techniques to control microwave devices is presented. For example, optically controlled switches and phase shifters can be useful for phased array antennas. Applications can be found also in the generation of millimeterwaves, optical probing, new microwave wide band devices
Author
Integrated Optics; Microwave Frequencies

20040047127 Raytheon Electronic Systems, El Segundo, CA, USA
RF Photonics for Beamforming and Array Applications
Lee, J. J.; Optics Microwave Interactions; April 2003, pp. 4-1 - 4-9; In English; See also 20040047121; Copyright; Avail: CASI; A02, Hardcopy

This paper was prepared for NATO's RTA Lecture Series No. 229 presented at the workshop of Optics-Microwave Interactions in September 2002. This lecture focuses on the applications of RF photonics for array antennas in signal distribution, beamforming, beam control, and antenna remoting. Examples are given to discuss the requirements, benefits, and design approaches of photonics for phased array antennas. The first demonstration of using photonics for a dual band array was conducted in 1990. Later a wide band conformal array controlled by photonics was built and tested. This example talks about the optical control of phased arrays by using fiber-optic links for RF and data remoting and a time-shift beamforming network for wide instantaneous bandwidth. Last, the talk will illustrate how photonics can be used to form a wide band feed system for multibeam arrays.
Author
Radio Frequencies; Photonics; Beamforming; Antenna Arrays

20040047241 Lawrence Livermore National Lab., Livermore, CA
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms
Scharlemann, E. T.; Breitfeller, E. F.; Henderson, J. R.; Kallman, J. S.; Morris, J. R.; Jul. 29, 2003; 14 pp.; In English
Report No.(s): DE2004-15005837; UCRL-JC-151554; No Copyright; Avail: Department of Energy Information Bridge

We describe modeling and simulation of long-range terrestrial laser communications links between static and mobile platforms. Atmospheric turbulence modeling, along with pointing, tracking and acquisition models are combined to provide an overall capability to estimate communications link performance.
NTIS
Optical Communication; Communication Networks; Atmospheric Models

20040047247 Alabama Univ., Huntsville, AL, USA
Characteristic Matrices for Spherical Shell Photonic Systems
Fuller, Kirk A.; Smith, David D.; January 2004; 3 pp.; In English; No Copyright; Avail: CASI; A01, Hardcopy

We establish a parallel between the transfer matrix used in the study of plane-parallel photonic structures and the matrix characterizing transfer of partial waves in concentric spheres. We derive explicit expressions for the elements of the transfer matrix for concentric spherical layers, and from those expressions derive the scattering coefficients of a multilayered sphere. The transfer matrices are 4x4 block diagonal with only four independent elements. Matrix elements for the case of TM waves are related to those for the case of TE waves through simple interchange and multiplicative constants. In analogy with plane parallel layers, the transfer matrix for concentric multilayers is simply the product of the transfer matrices of the individual layers.
Author
Matrices (Mathematics); Spherical Shells; Photonics; Laminates; Analogies

20040047262 Lawrence Livermore National Lab., Livermore, CA
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction
Thompson, C. A.; Wilks, S. C.; Brase, J. M.; Young, R. A.; Johnson, G. W.; Sep. 05, 2001; 14 pp.; In English
Report No.(s): DE2004-15005679; UCRL-JC-145326; No Copyright; Avail: Department of Energy Information Bridge

Horizontal path laser communications are beginning to provide attractive alternatives for high-speed optical communications, In particular, companies are beginning to sell fiberless alternatives for intranet and sporting event video. These applications are primarily aimed at short distance applications (on the order of 1 km pathlength). There exists a potential need to extend this pathlength to distances much greater than a lkm. For cases of long distance optical propagation, atmospheric turbulence will ultimately limit the maximum achievable data rate. In this paper, we propose a method of improved signal quality through the use of adaptive optics. In particular, we show work in progress toward a high-speed, small footprint Adaptive Optics system for horizontal path laser communications. Such a system relies heavily on recent progress in Micro-Electro- Mechanical Systems (MEMS) deformable mirrors as well as improved communication and computational components. In this paper we detail two Adaptive Optics approaches for improved through-put, the first is the compensated receiver (the traditional Adaptive Optics approach), the second is the compensated transmitter/receiver. The second approach

allows for correction of the optical wavefront before transmission kom the transmitter and prior to detection at the receiver.
NTIS
Adaptive Optics; Laser Applications; Microelectromechanical Systems; Free-Space Optical Communication

20040047263 Lawrence Livermore National Lab., Livermore, CA
Advanced Adaptive Optics Technology Development
Oliver, S. S.; Sep. 18, 2001; 16 pp.; In English
Report No.(s): DE2004-15005680; UCRL-JC-145423; No Copyright; Avail: Department of Energy Information Bridge

The NSF Center for Adaptive Optics (CfAO) is supporting research on advanced adaptive optics technologies. CfAO research activities include development and characterization of micro-electro-mechanical systems (MEMS) deformable mirror (DM) technology, as well as development and characterization of high-resolution adaptive optics systems using liquid crystal (LC) spatial light modulator (SLM) technology. This paper presents an overview of the CfAO advanced adaptive optics technology development activities including current status and future plans.
NTIS
Adaptive Optics; Microelectromechanical Systems

20040047269 Lawrence Livermore National Lab., Livermore, CA
Saturated Output Tabletop X-ray Lasers
Dunn, J.; Osterheld, A. L.; Nilsen, J.; Hunter, J. R.; Li, Y.; Dec. 01, 2000; 16 pp.; In English
Report No.(s): DE2004-15005760; UCRL-JC-138709; No Copyright; Avail: Department of Energy Information Bridge

The high efficiency method of transient collisional excitation has been successfully demonstrated for Ne-like and Ni-like ion x-ray laser schemes with small 5-10 J laser facilities. Our recent studies using the tabletop COMET (Compact Multipulse Terawatt) laser system at the Lawrence Livermore National Laboratory (LLNL) have produced several x-ray lasers operating in the saturation regime. Output energy of 10-15(micron)J corresponding to a gL product of 18 has been achieved on the Ni-like Pd 4d (yields) 4p transition at 147(angstrom) with a total energy of 5-7 J in a 600 ps pulse followed by a 1.2 ps pulse. Analysis of the laser beam angular profile indicates that refraction plays an important role in the amplification and propagation process in the plasma column. We report further improvement in the extraction efficiency by varying a number of laser driver parameters. In particular, the duration of the second short pulse producing the inversion has an observed effect on the x-ray laser output.
NTIS
X Ray Lasers; Excitation; Extraction; Inversions

20040050176 Lawrence Livermore National Lab., Livermore, CA
Modeling of Short-Pulse-Driven Nickel-like X-Ray Laser and Recent Experiments
Nilsen, J.; Dunn, J.; Jul. 27, 2001; 14 pp.; In English
Report No.(s): DE2004-15005865; UCRL-JC-141757; No Copyright; Avail: Department of Energy Information Bridge

The technique of using a nsec pulse to preform and ionize the plasma followed by a psec pulse to heat the plasma has enabled low-Z nickel-like ions to achieve saturated output when driven by small lasers with less than ten joules of energy. We model experiments done using the COMET laser at LLNL and the P 102 laser at Limeil to produce Ni-like Pd and Ag lasers. The COMET experiments use a 2 J, 600 ps prepulse followed 700 psec later by a 6 J, 6 psec drive pulse in a 1.6 cm long line focus. The P102 experiments used a somewhat larger energy and were able to use different combinations of frequency doubled light for both the prepulse and short pulse drive. The LASNEX code is used to calculate the hydrodynamic evolution of the plasma and provide the temperatures and densities to the CRETIN code, which then does the kinetics calculations to determine the gain. The temporal and spatial evolution of the plasmas are studied both with and without radiation transport included to understand the role of the self photopumping process on the gain of the Ni-lilce 4f + 4d laser lines as well as the gain of the usual collisionally driven Ni-like 4d + 4p laser lines. In particular we study why the 4f + 4d line lases well only when frequency doubled light is used with the prepulse in the P 102 experiments. Experimental results are presented for Ni-like Pd including two-dimensional near-field and far-field images.
NTIS
X Ray Lasers; Plasmas (Physics)

20040050346 California Univ., Lawrence Berkeley National Lab., Berkeley, CA, USA
Preparations for EUV Interferometry of the 0.3 NA MET Optic
2003; 20 pp.; In English
Report No.(s): DE2004-819978; No Copyright; Avail: Department of Energy Information Bridge

An at-wavelength interferometer is being created for the measurement and alignment of the 0.3 numerical aperture Micro Exposure Tool projection optic at EUV wavelengths. The prototype MET system promises to provide early learning from EUV lithographic imaging down to 20-nm feature size. The threefold increase to 0. 3 NA in the image-side numerical aperture presents several challenges for the extension of ultra-high-accuracy interferometry, including pinhole fabrication and the calibration and removal of systematic error sources.
NTIS
Interferometers; Extreme Ultraviolet Radiation

20040050353 NASA Marshall Space Flight Center, Huntsville, AL, USA
Coherence Phenomena in Coupled Optical Resonators
Smith, D. D.; Chang, H.; [2004]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

We predict a variety of photonic coherence phenomena in passive and active coupled ring resonators. Specifically, the effective dispersive and absorptive steady-state response of coupled resonators is derived, and used to determine the conditions for coupled-resonator-induced transparency and absorption, lasing without gain, and cooperative cavity emission. These effects rely on coherent photon trapping, in direct analogy with coherent population trapping phenomena in atomic systems. We also demonstrate that the coupled-mode equations are formally identical to the two-level atom Schrodinger equation in the rotating-wave approximation, and use this result for the analysis of coupled-resonator photon dynamics. Notably, because these effects are predicted directly from coupled-mode theory, they are not unique to atoms, but rather are fundamental to systems of coherently coupled resonators.
Author
Optical Resonators; Coherence; Photonics; Coupled Modes; Approximation

20040050389 Lockheed Martin Corp., Syracuse, NY, USA
Physical Basis for the Maximum Thermal Radiation Emisssion between Materials
Baldasaro, P. F.; Beausang, J. F.; 2003; 18 pp.; In English
Report No.(s): DE2004-821375; No Copyright; Avail: Department of Energy Information Bridge

An analytic basis for the limit on intra-media thermal radiation transport has been obtained as a simple function of temperature and material optical properties (n,k). It is shown that optical parameters determine the maximum radiative energy transfer rate by altering media radiative state density and energy density. Quantitative analysis shows that intra-media radiative transfer rates may exceed the radiation into free space as described by the Stephan-Boltzmann equation by several orders of magnitude. The frequency dependence of the optical properties further alters the expected blackbody spectral dependence. This generalized formulation of the limit to thermal radiation transfer in terms of media optical properties expands the understanding and future potential of radiative processes.
NTIS
Thermal Radiation; Radiative Transfer

20040050390 Michigan Univ., Ann Arbor, MI, USA, Ohio State Univ., Columbus, OH, USA
Properties of Materials for Designing Filters at Optical Frequencies
Topsakal, E.; Volakis, J. L.; 2003; 10 pp.; In English
Report No.(s): DE2004-821377; No Copyright; Avail: Department of Energy Information Bridge

Frequency Selective Surfaces/Volumes (FSS/Vs), periodic structures with frequency selective properties, have widely been used for millimeter and microwave applications. Some applications include filters (band pass, band stop), reflectors, radoms etc. FSS/Vs typically consist of a single or multiple material layers. Multiple layers (with each layer having a different frequency selectivity) are used for broadband applications. In recent years there has been an interest in using these structures at optical wavelengths. One of the applications is in thermophotovoltaic filters used to convert thermal energy into electricity. The filter is designed to transmit those wavelengths that can be efficiently converted into electricity, and to reflect other spectra, which leads to energy conservation and an increase in overall system efficiency. These filters can be used in space missions to help decrease energy consumption and reduce spacecraft mass, cost, and fuel loading. Numerical simulations of such filters are very limited in the literature. Existing modeling approaches are based on the assumption of purely metallic (perfectly conducting) structures on substrates. however, in practice, metals have finite conductivity that can lead to power absorption in the metal. At optical frequencies the usual material properties and perfect electric conductor (PEC) assumption is not applicable. Moreover, the conventional methods, such as using resistive sheets or lossy dielectrics to simulate metallic losses,

are not accurate. The goal is to provide a new approach for modeling metallic losses more accurately at the optical frequencies.
NTIS
Frequencies; Energy Consumption; Simulation

75
PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

20040046906 Colorado Univ., Boulder, CO, USA
Multibeam Phased Array Antennas
Popovic, Zoya; Romisch, Stefania; Rondineau, Sebastien; [2004]; 16 pp.; In English
Contract(s)/Grant(s): NAG5-11473; No Copyright; Avail: CASI; A03, Hardcopy

In this study, a new architecture for Ka-band multi-beam arrays was developed and demonstrated experimentally. The goal of the investigation was to demonstrate a new architecture that has the potential of reducing the cost as compared to standard expensive phased array technology. The goals of this specific part of the project, as stated in the yearly statement of work in the original proposal are: 1. Investigate bounds on performance of multi-beam lens arrays in terms of beamwidths, volume (size), isolation between beams, number of simultaneous beams, etc. 2. Design a small-scale array to demonstrate the principle. The array will be designed for operation around 3OGHz (Ka-band), with two 10-degree beamwidth beams. 3. Investigate most appropriate way to accomplish fine-tuning of the beam pointing within 5 degrees around the main beam pointing angle.
Derived from text
Architecture (Computers); Beams (Radiation); Phased Arrays

20040046959 Lawrence Livermore National Lab., Livermore, CA
NIF PEPC Mechanical Test Stand Safety Note
Trent, J. W.; May 21, 1998; 16 pp.; In English
Report No.(s): DE2004-15005721; UCRL-ID-145892; No Copyright; Avail: Department of Energy Information Bridge

The NIF PEPC Mechanical Test Stand is to be used in the building 432. Building 432 is being used to test components and processes for NIF. The test stand is to be bolted to the floor. The test stand provides a platform from which the PEPC kinematic repeatability and vibrational characteristics of the PEPC LRU can be tested. The test stand will allow user access to the LRU to install instrumentation and to make adjustments to the kinematics. The mechanical test stand is designed to hold the 1700 lb.
NTIS
Safety; Vibration

20040046974 Lawrence Livermore National Lab., Livermore, CA
Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties
Post, R. F.; Feb. 27, 2001; 26 pp.; In English
Report No.(s): DE2004-15005755; UCRL-JC-133102; No Copyright; Avail: Department of Energy Information Bridge

The results of five decades of experimental investigations of open-ended and closed magnetic confinement geometries are examined to see if intrinsic topology-dependent differences in their cross-field transport can be discerned. The evidence strongly supports a picture in which closed systems (stellarators, tokamaks, reversed-field pinches, etc.) are in all cases studied to date characterized by some level of plasma turbulence, leading to substantial deviations from purely classical cross-field transport. This transport is often describable as a 'Bohm-like' scaling with plasma temperature and magnetic field intensity. By contrast, open systems have in many significant examples been able to approach closely to classically predicted cross-field transport, including cases where the transport appeared to be more than five orders of magnitude slower than the Bohm-diffusion rate. To explain these differences the following tentative hypothesis is put forward: The differences arise from two sources: (1) differences in the instability driving terms arising from 'free-energy' sources, such as current flow along the field lines, etc. and, (2) differences in the nature of the boundary conditions for the various unstable waves that may be stimulated by these free energy sources within the plasma.
NTIS
Plasma Control; Transport Properties; Plasma Turbulence; Crossed Fields

20040047250 Lawrence Livermore National Lab., Livermore, CA
Turbulence Simulations of X-point Physics on the L-H Transitions
Xu, X. Q.; Cohen, R. H.; Nevins, W. M.; Porter, G. D.; Rensink, M. E.; Sep. 28, 2000; 18 pp.; In English
Report No.(s): DE2004-15005849; UCRL-JC-137618; No Copyright; Avail: Department of Energy Information Bridge

We show that the resistive X-point mode is dominant mode in boundary plasmas in X-point divertor geometry. The poloidal fluctuation phase velocity from the resistive X-point turbulence shows experimentally measured structure across separatrix. The fluctuation phase velocity is larger than E x B velocity both in L and H mode phases, by at least a factor of two. We also demonstrate that there is a strong poloidal asymmetry of particle flux in the proximity of the separatrix. Turbulence suppression in the L-H transition results when sources of energy and particles drive sufficient gradients as experiments.
NTIS
Turbulence; Diverters; Plasmas (Physics)

20040047252 Lawrence Livermore National Lab., Livermore, CA
Spheromak Formation Studies in SSPX
Hill, D. N.; Bulmer, R. H.; Cohen, B. I.; Hooper, E. B.; LoDestro, L. L.; Sep. 29, 2000; 12 pp.; In English
Report No.(s): DE2004-15005850; UCRL-JC-137828; No Copyright; Avail: Department of Energy Information Bridge

We present results from the Sustained Spheromak Physics Experiment (SSPX) at LLNL, which has been built to study energy confinement in spheromak plasmas sustained for up to 2 ms by coaxial DC helicity injection. Peak toroidal currents as high as 600kA have been obtained in the 1m dia. (0.23m minor radius) device using injection currents between 200-400kA; these currents generate edge poloidal fields in the range of 0.2-0.4T. The internal field and current profiles are inferred from edge field measurements using the CORSICA code. Density and impurity control is obtained using baking, glow discharge cleansing, and titanium gettering, after which long plasma decay times ((tau)(ge) 1.5ms) are observed and impurity radiation losses are reduced from (approx.)50% to lesser than 20% of the input energy. Thomson scattering measurements show peaked electron temperature and pressure profiles with T(sub e) (0)(approx.)120eV and (beta)(sub e)(approx.)7%.
NTIS
Spheromaks; Electron Energy; Plasma Decay

20040050167 Lawrence Livermore National Lab., Livermore, CA
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU
Zerbini, M.; Buratti, P.; Tudisco, O.; Giruzzi, G.; Jan. 31, 2000; 20 pp.; In English
Report No.(s): DE2004-15005771; UCRL-JC-142342; No Copyright; Avail: Department of Energy Information Bridge

The Electron Cyclotron Emission (ECE) diagnostic on FTU tokamak is routinely performed with a Michelson interferometer with spectral range extending up to 1300 GHz. The diagnostic allowed accurate electron temperature measurements during the recent 140 Ghz Electron Cyclotron Resonance Heating (ECRH) experiments on FTU. Very accurate measurements have been performed on a wide range of electron temperatures and profile peaking. The ECE measurements have been compared with Thomson Scattering and with observations of X-ray spectra from highly stripped molybdenum ions. The suprathermal emission in these conditions has been studied.
NTIS
Tokamak Devices; Spectra

20040050171 Lawrence Livermore National Lab., Livermore, CA
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition
Stephens, R. B.; Nikroo, A.; Hill, D.; Smith, J. N.; Hatchett, S. P.; Aug. 23, 2003; 12 pp.; In English
Report No.(s): DE2004-15005825; UCRL-JC-152045; No Copyright; Avail: Department of Energy Information Bridge

Targets designed for fast ignition must have clear access for the ignitor laser to the compressed core. This is provided in current concepts by embedding a reentrant cone in the shell, the tip of the cone close to the center of the shell. We have designed a gas-tight direct-drive FI target as the first step in developing a FI ignition target, and have studied its implosion dynamics at Omega with back-lit and self-emission framing cameras. A step in the cone surface, and Al on the shell was required to make the assembly gas-tight; these assemblies withstood greater than 10 atm and had a typical pressure half-life of 2-6 hrs. The implosion of these targets was substantially different from that of previous indirect drive targets; there was

much less vaporization of the Au cone, much clearer structure in the collapsing shells, and a possibility that the hot core could escape around the cone rather than punch in its tip.
NTIS
Ignition; Mechanical Drives; Targets; Cameras; Cones

20040050177 Lawrence Livermore National Lab., Livermore, CA
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions
Savin, D. W.; Badnell, N. R.; Bartsch, T.; Brandau, C.; Chen, M. H.; Jun. 06, 2000; 10 pp.; In English
Report No.(s): DE2004-15005858; UCRL-JC-139163; No Copyright; Avail: Department of Energy Information Bridge

Iron ions provide many valuable plasma diagnostics for cosmic plasmas. The accuracy of these diagnostics, however, often depends on an accurate understanding of the ionization structure of the emitting gas. Dielectronic recombination (DR) is the dominant electron-ion recombination mechanism for most iron ions in cosmic plasmas. Using the heavy-ion storage ring at the Max-Planck-Institute for Nuclear Physics in Heidelberg, Germany, we have measured the low temperature DR rates for Fe(sup q+) where q = 15, 17, 18, and 19. These rates are important for photoionized gases which form in the media surrounding active galactic nuclei, X-ray binaries, and cataclysmic variables. Our results demonstrate that commonly used theoretical approximations for calculating low temperature DR rates can easily under- or over-estimate the DR rate by a factor of (approx.) 2 or more.
NTIS
Storage Rings (Particle Accelerators); Electron-Ion Recombination; Gas Ionization; Active Galactic Nuclei

20040050178 Lawrence Livermore National Lab., Livermore, CA
Preliminary Safety Assessment for an IFE Target Fabrication Facility
Latkowski, J. F.; Reyes, S.; Besenbruch, G. E.; Goodin, D. T.; Oct. 13, 2000; 12 pp.; In English
Report No.(s): DE2004-15005856; UCRL-JC-138864; No Copyright; Avail: Department of Energy Information Bridge

We estimate possible ranges of tritium inventories for an inertial fusion energy (IFE) target fabrication facility producing various types of targets and using various production technologies. Target fill is the key subtask in determining the overall tritium inventory for the plant. By segmenting the inventory into multiple, parallel production lines--each with its own fill canister--and including an expansion tank to limit releases, we are able to ensure that a target fabrication facility would meet the accident dose goals of 10 mSv (1 rem) set forth in the Department of Energy's Fusion Safety Standards. For indirect-drive targets, we calculate release fractions for elements from lithium to bismuth and show that nearly all elements meet the dose goal. Our work suggests directions for future R&D that will help reduce total tritium inventories and increase the flexibility of target fabrication facilities.
NTIS
Targets; Dosage; Lithium; Tritium

20040050185 Lawrence Livermore National Lab., Livermore, CA
Overview of IFE Chamber and Target Technologies R&D in the U.S
Meier, W. R.; Abdou, A.; Kulcinski, G. L.; Moir, R. W.; Nobile, A.; Sep. 22, 2000; 14 pp.; In English
Report No.(s): DE2004-15005853; UCRL-JC-138507; No Copyright; Avail: Department of Energy Information Bridge

The U.S. Department of Energy, Office of Fusion Energy Science (OFES) formed the Virtual Laboratory for Technology (VLT) to develop the technologies needed to support near term fusion experiments and to provide the basis for future magnetic and inertial fusion energy power plants. The scope of the inertial fusion energy (IFE) element of the VLT includes the fusion chamber, driver/chamber interface, target fabrication and injection, and safety and environmental assessment for IFE. Lawrence Livermore National Laboratory, in conjunction with other laboratories, universities and industry, has written an R&D plan to address the critical issues in these areas over the next 5 years in a coordinated manner. This paper provides an overview of the U.S. research activities addressing these critical issues.
NTIS
Nuclear Fusion; Targets

20040050186 Lawrence Livermore National Lab., Livermore, CA
Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory
Latkowski, J. F.; Reyes, S.; Meier, R.; Jun. 01, 2000; 18 pp.; In English
Report No.(s): DE2004-15005854; UCRL-JC-138555; No Copyright; Avail: Department of Energy Information Bridge

Lawrence Livermore National Laboratory (LLNL) is making significant progress in several areas related to the safety and environmental (S and E) aspects of inertial fusion energy (IFE). A detailed accident analysis has been completed for the HYLIFE-II power plant design. Additional accident analyses are underway for both the HYLIFE-II and Sombrero designs. Other S and E work at LLNL has addressed the issue of the driver-chamber interface and its importance for both heavy-ion and laser-driven IFE. Radiation doses and fluences have been calculated for final focusing mirrors and magnets and shielding optimization is underway to extend the anticipated lifetimes for key components. Target designers/fabrication specialists have been provided with ranking information related to the S and E characteristics of candidate target materials (e.g., ability to recycle, accident consequences, and waste management). Ongoing work in this area will help guide research directions and the selection of target materials. Published and continuing work on fast ignition has demonstrated some of the potentially attractive S and E features of such designs.
NTIS
Safety; Waste Management; Accident Investigation

20040050187 Lawrence Livermore National Lab., Livermore, CA
Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities
Edwards, J.; Robey, H.; Mackinnon, A.; Jun. 29, 2001; 12 pp.; In English
Report No.(s): DE2004-15006189; UCRL-ID-144268; No Copyright; Avail: Department of Energy Information Bridge
Explore the combination of optical diagnostics and gaseous targets to obtain important information about compressible turbulent flows that cannot be derived from traditional laser experiments for the purposes of V and V of hydrodynamics models and understanding scaling. First year objectives: Develop and characterize blast wave-gas jet test bed; Perform single pulse shadowgraphy of blast wave interaction with turbulent gas jet as a function of blast wave Mach number; Explore double pulse shadowgraphy and image correlation for extracting velocity spectra in the shock-turbulent flow interaction; and Explore the use/adaptation of advanced diagnostics.
NTIS
Laser Targets; Diagnosis; Shadowgraph Photography

20040050190 Lawrence Livermore National Lab., Livermore, CA
Heavy-Ion Fusion Final Focus Magnet Shielding Designs
Latkowski, J. F.; Meier, W. R.; Oct. 11, 2000; 12 pp.; In English
Report No.(s): DE2004-15005855; UCRL-JC-138701; No Copyright; Avail: Department of Energy Information Bridge
At the Thirteenth International Symposium on Heavy Ion Inertial Fusion (HIF Symposium), we presented magnet shielding calculations for 72-, 128, 200, and 288-beam versions of the HYLIFE-II power plant design. In all cases, we found the radiation-limited lifetimes of the last set of final focusing magnets to be unacceptably short. Since that time, we have completed follow-on calculations to improve the lifetime of the 72-beam case. Using a self-consistent final focusing model, we vary parameters such as the shielding thicknesses and compositions, focusing length, angle-of-attack to the target, and the geometric representation of the flibe pocket, chamber, and blanket. By combining many of these shielding features, we are able to demonstrate a magnet shielding design that would enable the last set of final focusing magnets to survive for the lifetime of the power plant.
NTIS
Heavy Ions; Magnets; Shielding

20040050255 Lawrence Livermore National Lab., Livermore, CA
Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D
Porter, G. D.; Boedo, J. A.; Groebner, R. J.; Carlstrom, T. N.; Rognlien, T. D.; Jun. 05, 2001; 10 pp.; In English
Report No.(s): DE2004-15006133; UCRL-JC-142107; No Copyright; Avail: Department of Energy Information Bridge
Simulations of plasmas with a DIII-D shape indicate plasma drifts are important at power levels near the L- to H-mode plasma transition. In addition to enhancing plasma flows in the divertor region, drifts are found to play a key role in establishing highly sheared radial electric fields in the edge of the confined plasma, for the physics of the high confinement operating mode (H-mode). Measurements of the plasma structure in the vicinity of the X-point of DIII-D indicate the importance of drifts on plasma flow between the scrape-off layer (SOL) and closed field lines. The large electric fields provide large flows around the X-point, and these are conjectured to play a role in the transition from L- to H-mode confinement. These results indicate the relevance of modeling the edge and SOL plasmas of present tokamak devices using models which include E x B,(del)B, and pressure gradient drifts. The results of simulation of specific DIII-D discharges is reported in this paper. They

start with discussion of the simulation of an Ohmic discharge in Section 2, including a study of the effect of varying several operational parameters. Simulation of a higher triangularity L-mode discharge is discussed in Section, and a summary is given in Section 4.
NTIS
Plasma Drift; Confinement; Diverters

20040050324 Lawrence Livermore National Lab., Livermore, CA
Plasma Diagnostics in High-Resolution X-ray Spectra of Magnetic Cataclysmic Variables
Mauche, C. W.; Oct. 02, 2001; 16 pp.; In English
Report No.(s): DE2004-15006081; UCRL-JC-145738; No Copyright; Avail: Department of Energy Information Bridge
Using the Chandra HETG spectrum of EX Hya as an example, we discuss someof the plasma diagnostics available in high-resolution X-ray spectra of magnetic cataclysmic variables. Specifically, for conditions appropriateto collisional ionization equilibrium plasmas, we discuss the temperature dependence of the H- to He-like line intensity ratios and the density and photoexcitation dependence of the He-like R line ratios and the Fe XVII I(17.10(angstrom)) /I(17.05(angstrom)) line ratio. We show that the plasma temperature in EX Hya spans the range from (approx.) 0.5 to (approx.) 10 keV and that the plasma density n(ge) 2 x 10(sup 14) cm(sup -3), orders of magnitude greater than that observed inthe Sun or other late-type stars.
NTIS
Plasma Diagnostics; X Ray Spectra

20040050347 Princeton Univ., NJ
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment
Kessel, C. E.; Meade, D.; Swain, D. W.; Titus, P.; Ulrickson, M. A.; Oct. 2003; 12 pp.; In English
Report No.(s): DE2004-820106; PPPL-3884; No Copyright; Avail: Department of Energy Information Bridge
The Advanced Tokamak capability of the FIRE burning plasma experiment is examined with 0D systems analysis, equilibrium and ideal MHD stability, RF current drive analysis, and full discharge dynamic simulations. These analyses have identified the required parameters for attractive burning AT plasmas, and indicate that these are feasible within the engineering constraints of the device.
NTIS
Tokamak Devices; Magnetohydrodynamic Stability; Plasmas (Physics)

20040050360 Lawrence Livermore National Lab., Livermore, CA
Inertial Fusion and High-Energy-Density Science in the USA
Tarter, C. B.; Sep. 06, 2001; 14 pp.; In English
Report No.(s): DE2004-15006310; UCRL-JC-144831; No Copyright; Avail: Department of Energy Information Bridge
Inertial fusion and high-energy density science worldwide is poised to take a great leap forward. In the US, programs at the University of Rochester, Sandia National Laboratories, Los Alamos National Laboratory, Lawrence Livermore National Laboratory (LLNL), the Naval Research Laboratory, and many smaller laboratories have laid the groundwork for building a facility in which fusion ignition can be studied in the laboratory for the first time. The National Ignition Facility (NIF) is being built by the Department of Energy's National Nuclear Security Agency to provide an experimental test bed for the US Stockpile Stewardship Program (SSP) to ensure the dependability of the country's nuclear deterrent without underground nuclear testing. NIF and other large laser systems being planned such as the Laser MegaJoule (LMJ) in France will also make important contributions to basic science, the development of inertial fusion energy, and other scientific and technological endeavors. NIF will be able to produce extreme temperatures and pressures in matter. This will allow simulating astrophysical phenomena (on a tiny scale) and measuring the equation of state of material under conditions that exist in planetary cores.
NTIS
Thermonuclear Reactions; Flux Density

20040050366 NASA Marshall Space Flight Center, Huntsville, AL, USA
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition
Nishikawa, K. I.; Richardson, G.; Koide, S.; Shibata, K.; Kudoh, T.; Hardee, P.; Fushman, G. J.; [2004]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only
We have performed the first fully three-dimensional general relativistic magnetohydrodynamic (GRMHD) simulation of

jet formation from a thin accretion disk around a Schwarzschild black hole with a free-falling corona. The initial simulation results show that a bipolar jet (velocity sim 0.3c) is created as shown by previous two-dimensional axisymmetric simulations with mirror symmetry at the equator. The 3-D simulation ran over one hundred light-crossing time units which is considerably longer than the previous simulations. We show that the jet is initially formed as predicted due in part to magnetic pressure from the twisting the initially uniform magnetic field and from gas pressure associated with shock formation. At later times, the accretion disk becomes thick and the jet fades resulting in a wind that is ejected from the surface of the thickened (torus-like) disk. It should be noted that no streaming matter from a donor is included at the outer boundary in the simulation (an isolated black hole not binary black hole). The wind flows outwards with a wider angle than the initial jet. The widening of the jet is consistent with the outward moving shock wave. This evolution of jet-disk coupling suggests that the low/hard state of the jet system may switch to the high/soft state with a wind, as the accretion rate diminishes.
Author (revised)
Magnetohydrodynamics; Black Holes (Astronomy); Three Dimensional Models; Astronomical Models; Accretion Disks

20040050740 Los Gatos Research, Mountain View, CA
Optimization of Off-Axis ICOS and Applications to Flow Tube Kinetics
Gupta, Manish; O'Keefe, Anthony; Dec. 31, 2003; 12 pp.; In English
Contract(s)/Grant(s): F49620-03-1-0412
Report No.(s): AD-A421046; 4081; AFRL-SR-AR-TR-04-0158; No Copyright; Avail: CASI; A03, Hardcopy

In this AFOSR granting period, Los Gatos Research explored the capabilities of Off-Axis Integrated Cavity Output Spectroscopy (Off-Axis ICOS) with an especial emphasis towards flow-tube kinetics studies. Specifically, search was performed to ascertain the application of Off-Axis ICOS to spatial imaging, time-dependant phenomenon, and through-plasma spectroscopy. Achievements included developing a theoretical framework to simulate spot pattern images in the presence of spatially-inhomogeneous cavity loss, simulating the time- dependent cavity transmission for both impulse function and rapidly-modulating absorption losses, and measuring a variety of energetic species within a radio frequency inductively coupled plasma (RF-ICP).
DTIC
Kinetics; Plasmas (Physics)

20040050812
International Conference on Phenomena in Ionized Gases (26th) Held in Greifswald, Germany on 15-20 July 2003. Proceedings, Volume 4
Meichsner, J.; Jul. 20, 2003; 269 pp.; In English
Contract(s)/Grant(s): FA8655-03-1-5023
Report No.(s): AD-A421147; EOARD-CSP-03-5023; No Copyright; Avail: CASI; A12, Hardcopy

The Final Proceedings for XXVI International Conference on Phenomena in Ionized Gases. 15 July 2003 - 20 July 2003. The scientific program covers most aspects of phenomena in ionized gases, with special emphasis on moderate- temperature plasmas. Additionally, two conference workshops (plasma light sources; reactive plasmas and surface interaction) are organized from the Local Organizing Committee.
DTIC
Conferences; Germany; Ionized Gases

20040051076 NASA Marshall Space Flight Center, Huntsville, AL, USA
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube
Vine, Frances J.; Mankowski, John J.; Saeks, Richard E.; Chow, Alan S.; [2003]; 7 pp.; In English; JANNAF Conference Meeting, 1-5 Dec. 2003, Colorado Springs, CO, USA
Contract(s)/Grant(s): NAS8-00137; NAS1-00064; N00178-01-C-1039; No Copyright; Avail: CASI; A02, Hardcopy

A number of researchers have observed that the intensity of a shock wave is reduced when it passes through a weakly ionized plasma. While there is little doubt that the intensity of a shock is reduced when it propagates through a weakly ionized plasma, the major question associated with the research is whether the reduction in shock wave intensity is due to the plasma or the concomitant heating of the flow by the plasma generator. The goal of this paper is to describe a temperature compensated experiment in a 'large' diameter shock tube with an external heating source, used to control the temperature in the shock tube independently of the plasma density.
Author
Shock Waves; Shock Tubes; Plasma Generators; Plasmas (Physics)

76
SOLID-STATE PHYSICS

Includes condensed matter physics, crystallography, and superconductivity. For related information see also *33 Electronics and Electrical Engineering*; and *36 Lasers and Masers*.

20040046149 NASA Glenn Research Center, Cleveland, OH, USA
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers
Miranda, Felix A.; Theofylaktos, Noulle; Robinson, Daryl C.; Mueller, Carl H.; Pinto, Nicholas J.; February 05, 2004; 2 pp.; In English; The Northeast Ohio Nanoscience and Nanotechnology Research Symposium, 17 Feb. 2004; No Copyright; Avail: CASI; A01, Hardcopy

Novel translators and logic devices based on nanotechnology concepts are under intense development. The potential for ultra-low power circuitry makes nanotechnology attractive for applications such as digital electronics and sensors. Furthermore, the ability to form devices on flexible substrates expands the range of applications where electronic circuitry can be introduced. For NASA, nonotechndogy offers opportunities for increased onboard data processing and thus autonomous decision-making ability, ad novel sensors that detect and respond to external stimuli with few oversight requirements. The goat of this work is to demonstrate transistor behavior in polyaniline/ polyethylene oxide nanofibers, thus creating a foundation for future logic devices.
Author
Field Effect Transistors; Polyethylenes; Circuits; Digital Electronics

20040047282 NASA Marshall Space Flight Center, Huntsville, AL, USA
Semiconductor Crystal Growth in Static and Rotating Magnetic fields
Volz, Martin; January 2004; 1 pp.; In English; International Workshop on Materials Analysis & Processing in Magnetic Fields, 17-19 Mar. 2004, Tallahassee, FL, USA; No Copyright; Avail: Other Sources; Abstract Only

Magnetic fields have been applied during the growth of bulk semiconductor crystals to control the convective flow behavior of the melt. A static magnetic field established Lorentz forces which tend to reduce the convective intensity in the melt. At sufficiently high magnetic field strengths, a boundary layer is established ahead of the solid-liquid interface where mass transport is dominated by diffusion. This can have a significant effect on segregation behavior and can eliminate striations in grown crystals resulting from convective instabilities. Experiments on dilute (Ge:Ga) and solid solution (Ge-Si) semiconductor systems show a transition from a completely mixed convective state to a diffusion-controlled state between 0 and 5 Tesla. In HgCdTe, radial segregation approached the diffusion limited regime and the curvature of the solid-liquid interface was reduced by a factor of 3 during growth in magnetic fields in excess of 0.5 Tesla. Convection can also be controlled during growth at reduced gravitational levels. However, the direction of the residual steady-state acceleration vector can compromise this effect if it cannot be controlled. A magnetic field in reduced gravity can suppress disturbances caused by residual transverse accelerations and by random non-steady accelerations. Indeed, a joint program between NASA and the NHMFL resulted in the construction of a prototype spaceflight magnet for crystal growth applications. An alternative to the suppression of convection by static magnetic fields and reduced gravity is the imposition of controlled steady flow generated by rotating magnetic fields (RMF)'s. The potential benefits of an RMF include homogenization of the melt temperature and concentration distribution, and control of the solid-liquid interface shape. Adjusting the strength and frequency of the applied magnetic field allows tailoring of the resultant flow field. A limitation of RMF's is that they introduce deleterious instabilities above a critical magnetic field value. Growth conditions in which static magnetic fields rotational magnetic fields, and reduced gravitational levels can have a beneficial role will be described.
Author
Crystal Growth; Magnetic Fields; Rotation; Semiconductors (Materials); Statics

20040050259 Massachusetts Inst. of Tech., Lexington, MA, USA
Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts
Wang, C. A.; Shiau, D. A.; Huang, R. K.; Harris, C. T.; Connors, M. K.; 2003; 18 pp.; In English
Report No.(s): DE2004-821380; No Copyright; Avail: Department of Energy Information Bridge

A comparison of n-GaSb and n-GaInAsSb epilayers for ohmic contacts in GaSb-based devices is studied. The epilayers were grown by organometallic vapor phase epitaxy and doped with Te. At similar electron concentrations, the atomic Te concentration, as determined by secondary ion mass spectroscopy, is more than 2 times higher in n-GaSb compared to n-GaInAsSb. In addition, the electron mobility is lower in n-GaSb than n-GaInAsSb at similar electron concentrations. The electron concentration saturates at about 1.3 x 10(sup 18) cm(sup -3) for n-GaSb, but linearly increases for n-GaInAsSb.

Pd/Ge/Au/Pt/Au metallization was studied for ohmic contacts. A specific contact resistivity of 1 x 10(exp -5)(Omega)sq cm for n-GaSb was measured. The specific contact resistivity can be greatly improved by contacting n-GaInAsSb, and a significantly lower specific contact resistivity of 2 x 10(exp -6)(Omega)/sq cm for n-GaInAsSb was measured.
NTIS
Doped Crystals; Electrical Resistivity; Electron Density (Concentration); Gallium Antimonides; Vapor Phase Epitaxy

20040050305 Lockheed Martin Corp., Syracuse, NY, USA, Rensselaer Polytechnic Inst., Troy, NY, USA
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy
Wang, C. A.; Vineiso, C. J.; Calawa, D. R.; Feb. 2002; 14 pp.; In English
Report No.(s): DE2004-820701; LM-02K008; No Copyright; Avail: Department of Energy Information Bridge
The first AlGaAsSb/GaSb quarter-wave distributed Bragg reflectors grown by metallic vapor phase epitaxy are reported. The peak reflectance is 96% for a 10-period structure.
NTIS
Vapor Phase Epitaxy; Organometallic Compounds; Gallium Antimonides; Bragg Reflectors

20040050391 State Univ. of New York, Stony Brook, NY, USA, Massachusetts Inst. of Tech., Lexington, MA, USA, Rensselaer Polytechnic Inst., Troy, NY, USA, Lockheed Martin Corp., Syracuse, NY, USA
Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence
Anikeev, S.; Donetsky, D.; Belenky, G.; Luryi, S.; Wang, C. A.; 2003; 22 pp.; In English
Report No.(s): DE2004-821378; No Copyright; Avail: Department of Energy Information Bridge
Auger recombination in p-type GaSb, InAs and their alloys is enhanced due to the proximity of the bandgap energy and the energy separation to the spin split-off valence band. This can affect the device performance even at moderate doping concentration. They report electron lifetime measurements in a p-type 0.54-eV GaInAsSb alloy, commonly used in a variety of infrared devices. They have studied a series of double-capped heterostructures with varied thicknesses and doping levels, grown by organometallic vapor phase epitaxy on GaSb substrates. The Auger coefficient value of 2.3 x 10(sup -28) cm(sup 6)/s is determined by analyzing the photoluminescence decay constants with a systematic separation of different recombination mechanisms.
NTIS
Infrared Radiation; Organometallic Compounds; Photoluminescence; Vapor Phase Epitaxy

20040050404 Rensselaer Polytechnic Inst., Troy, NY, USA, Massachusetts Inst. of Tech., Lexington, MA, USA, Sarnoff Corp., Princeton, NJ, USA
Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques
Kumar, R. J.; Borrego, J. M.; Dutta, P. S.; Gutmann, R. J.; Wang, C. A.; Oct. 2002; 20 pp.; In English
Report No.(s): DE2004-820721; LM-02K102; No Copyright; Avail: Department of Energy Information Bridge
RF photoreflection measurements and PC-1D simulations have been used to evaluate bulk and surface recombination parameters in antimonide-based materials. PC-1D is used to simulate the photoconductivity response of antimonide-based substrates and doubly-capped epitaxial layers and also to determine how to extract the recombination parameters using experimental results. Excellent agreement has been obtained with a first-order model and test structure simulation when Shockley-Reed-Hall (SRH) recombination is the bulk recombination process. When radiative, Auger and surface recombination are included, the simulation results show good agreement with the model. RF photoreflection measurements and simulations using PC-1D are compatible with a radiative recombination coefficient (B) of approximately 5 x 10(sup -11) cm(sup 3)/s, Auger coefficient (C)(approx) 1.0 x 10(sup -28) cm(sup 6)/s and surface recombination velocity (SRV)(approx) 600 cm/s for 0.50-0.55 eV doubly-capped InGaAsSb material with GaSb capping layers using the experimentally determined active layer doping of 2 x 10(sup 17) cm(sup -3). Photon recycling, neglected in the analysis and simulations presented, will affect the extracted recombination parameters to some extent.
NTIS
Antimonides; Semiconductors (Materials); Computerized Simulation

20040050846 Naval Air Warfare Center, China Lake, CA
Review of Navy Program to Develop Optical Quality Diamond Windows and Domes
Harris, Daniel G.; May 2002; 17 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421202; No Copyright; Avail: CASI; A03, Hardcopy

From 1989 to 2000, the U,S. Navy sponsored research and exploratory development programs to make optical quality chemical vapor deposited diamond and to learn its properties. This paper recounts the development of optical quality diamond and discusses the properties and fabrication capabilities that were achieved. In the year 2002, there exists a commercial capability for optical quality diamond, but the price keeps it out of the hands of all but a few potential users.
DTIC
Diamonds; Navy; Vapor Deposition

20040050847 Naval Air Warfare Center, China Lake, CA
Does Anyone Out There Know the Strength of Sapphire?
Harris, Daniel G.; May 2002; 16 pp.; In English; Original contains color illustrations
Report No.(s): AD-A421203; No Copyright; Avail: CASI; A03, Hardcopy

Results are compared for several different sets of 4-point flexure strength measurements on sapphire as a function of crystal orientation and temperature. The only consistent trend is that strength drops rapidly with increasing temperature when the c-axis of the crystal is the principal axis of tension and compression. Using Grafoil between sapphire and the load fixture increases the apparent strength of specimens whose principal axis is c by a factor of 2-3, but has little effect on other crystallographic orientations. The rate of crack propagation on the m-plane of sapphire increases by 7 orders of magnitude between 20 and 600 deg C.
DTIC
Sapphire

77
PHYSICS OF ELEMENTARY PARTICLES AND FIELDS

Includes quantum mechanics; theoretical physics; and statistical mechanics. For related information see also *72 Atomic and Molecular Physics, 73 Nuclear Physics*, and *25 Inorganic, Organic and Physical Chemistry*.

20040047078 European Organization for Nuclear Research, Geneva, Switzerland, Rochester Univ., NY, USA, Fermi National Accelerator Lab., Batavia, IL, USA, Southampton Univ., UK
Summary of Working Group 2
Autin, B.; Harris, D. A.; King, S. F.; McFarland, K. S.; Yasuda, O.; 2003; 18 pp.; In English
Report No.(s): DE2003-816107; No Copyright; Avail: Department of Energy Information Bridge

In this summary we try to give an overview of what the issues are in both understanding the origin of neutrino oscillations, how to go from experimental measurements to oscillation parameters, and finally how to make the experimental measurements themselves.
NTIS
Oscillations; Radiation Counters; Neutrinos; Neutrino Beams

81
ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

20040045334 NASA Glenn Research Center, Cleveland, OH, USA
Collaborative Engineering for Research and Development
Davis, Jose M.; Keys, L. Ken; Chen, Injazz J.; February 2004; 15 pp.; In English; 13th International Conference on Management of Techonolgy, 3-7 Apr. 2003, Washington, DC, USA
Contract(s)/Grant(s): WBS 22-755-81-01
Report No.(s): NASA/TM-2004-212965; NAS 1.15:212965; E-14438; No Copyright; Avail: CASI; A03, Hardcopy

Research and development (R&D) organizations are being required to be relevant, to be more application-oriented, and to be partners in the strategic management of the business while meeting the same challenges as the rest of the organization, namely: (1) reduced time to market; (2) reduced cost; (3) improved quality; (4) increased reliability; and (5) increased focus on customer needs. Recent advances in computer technology and the Internet have created a new paradigm of collaborative engineering or collaborative product development (CPD), from which new types of relationships among researchers and their partners have emerged. Research into the applicability and benefits of CPD in a low/no production, R&D, and/or government

environment is limited. In addition, the supply chain management (SCM) aspects of these relationships have not been studied. This paper presents research conducted at the NASA Glenn Research Center (GRC) investigating the applicability of CPD and SCM in an R&D organization. The study concentrates on the management and implementation of space research activities at GRC. Results indicate that although the organization is engaged in collaborative relationships that incorporate aspects of SCM, a number of areas, such as development of trust and information sharing merit special attention.
Author
Research and Development; Product Development; Concurrent Engineering; NASA Programs

20040045335 NASA Glenn Research Center, Cleveland, OH, USA
Collaborative Product Development in an R&D Environment
Davis, Jose M.; Keys, L. Ken; Chen, Injazz J.; Peterson, Paul L.; February 2004; 11 pp.; In English; Annual Conference, 15-19 May 2004, Houston, TX, USA
Contract(s)/Grant(s): WBS 22-755-81-01
Report No.(s): NASA/TM-2004-212967; NAS 1.15:212967; E-14440; No Copyright; Avail: CASI; A03, Hardcopy

Research and development (R&D) organizations are being required to be relevant, to be more application-oriented, and to be partners in the strategic management of the business while meeting the same challenges as the rest of the organization, namely: (1) reduced time to market; (2) reduced cost; (3) improved quality; (4) increased reliability; and (5) increased focus on customer needs. Recent advances in computer technology and the Internet have created a new paradigm of collaborative engineering or collaborative product development (CPD), from which new types of relationships among researchers and their partners have emerged. Research into the applicability and benefits of CPD in a low/no production, R&D, and/or government environment is limited. In addition, the supply chain management (SCM) aspects of these relationships have not been studied. This paper presents research conducted at the NASA Glenn Research Center (GRC) investigating the applicability of CPD and SCM in an R&D organization. The study concentrates on the management and implementation of space research activities at GRC. Results indicate that although the organization is engaged in collaborative relationships that incorporate aspects of SCM, a number of areas, such as development of trust and information sharing merit special attention.
Author
Research and Development; Product Development; Concurrent Engineering; Project Management; NASA Programs

82
DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer program documentation see *61 Computer Programming and Software*.

20040045314 Research Inst. for Advanced Computer Science, Moffett Field, CA, USA
A Bibliography of Aspect-Oriented Software Development, Version 1.1
Filman, Robert E.; January 2003; 31 pp.; In English
Contract(s)/Grant(s): NCC2-1006; No Copyright; Avail: CASI; A03, Hardcopy

A bibliography of the literature related to Aspect-Oriented Software Development are presented in this report.
CASI
Bibliographies; Computer Programming

20040045355 NASA Ames Research Center, Moffett Field, CA, USA
A One-Stop Web Application for the Mars Team
Laufenberg, Lawrence; January 06, 2004; 2 pp.; In English; No Copyright; Avail: CASI; A01, Hardcopy

THe Mars Exploration Rover Collaborative Information Portal (MERCIP) provides a window to all mission events. It supports mission updates, data sharing, and collaboration. The report also discusses: Technology spotlight. Integrating data multiple sources. Securing access for multiple clients. A new information infrastructure.
CASI
Mars Exploration; Information Management; Technology Assessment

20040046154 Nebraska Univ., Omaha, NE, USA

Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal

Bowen, Brent D.; Russell, Valerie; Vlasek, Karisa; Avery, Shelly; Calamaio, Larry; Carstenson, Larry; Farritor, Shane; deSilva, Shan; Dugan, James; Farr, Lynne, et al.; November 2003; 22 pp.; In English

Report No.(s): UNOAI-Rept-03-4; Copyright; Avail: CASI; A03, Hardcopy

The NASA Nebraska Space Grant Consortium (NSGC) continues to recognize the necessity of increasing the quantity and quality of highly skilled graduates and faculty involved with NASA. Through NASA Workforce Development funds awarded in 2002, NSGC spearheaded customer- focused workforce training and higher education, industry and community partnerships that are significantly impacting the state s workforce in the science, technology, engineering, and mathematics (STEM) competencies. NSGC proposes to build upon these accomplishments to meet the steadily increasing demand for STEM skills and to safeguard minority representation in these disciplines. A wide range of workforce development activities target NASA s need to establish stronger connections among higher education, industry, and community organizations. Participation in the National Student Satellite Program (NSSP), Community Internship Program, and Nebraska Science and Technology Recruitment Fair will extend the pipeline of employees benefiting NASA as well as Nebraska. The diversity component of this proposal catapults from the exceptional reputation NSGC has built by delivering geospatial science experiences to Nebraska s Native Americans. For 6 years, NSGC has fostered and sustained partnerships with the 2 tribal colleges and 4 reservation school districts in Nebraska to foster aeronautics education and outreach. This program, the Nebraska Native American Outreach Program (NNAOP), has grown to incorporate more than educational institutions and is now a partnership among tribal community leaders, academia, tribal schools, and industry. The content focus has broadened from aeronautics in the school systems to aerospace technology and earth science applications in tribal community decision-making and workforce training on the reservations. To date, participants include faculty and staff at 4 Nebraska tribal schools, 2 tribal colleges, approximately 1,000 Native American youth, and over 1,200 community members. This Native American Initiative of the NSGC addresses Nebraska workforce development and serves as a model to others. Following a structured evaluation process, NSGC proposes to sustain delivery of the training funded by NASA in 2002 to tribal entities through partnerships linking academic programs and industry leaders.

Derived from text

Education; Universities; Technology Utilization; Research and Development; Students; Information Transfer

20040046919 NASA Langley Research Center, Hampton, VA, USA

NASA Langley Scientific and Technical Information Output-2002

Stewart, Susan H., Compiler; December 2003; 190 pp.; In English

Report No.(s): NASA/TM-2003-212675; L-18350; No Copyright; Avail: CASI; A09, Hardcopy

This document is a compilation of the scientific and technical information that the Langley Research Center has produced during the calendar year 2002. Included are citations for Technical Publications, Conference Publications, Technical Memorandums, Contractor Reports, Journal Articles and Book Publications, Meeting Presentations, Technical Talks, and Patents.

Author

Bibliographies; Reports; Conferences

20040046941 Houston Univ.-Clear Lake, Houston, TX, USA

Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA

Bilstein, Roger E.; 2003; 2 pp.; In English; Copyright; Avail: Other Sources

The National Advisory Committee for Aeronautics--forerunner of today's NASA--emerged in 1915, when airplanes were curiosities made of wood and canvas and held together with yards of baling wire. At the time an unusual example of government intrusion (and foresight, given the importance of aviation to national military concerns), the committee oversaw the development of wind tunnels, metal fabrication, propeller design, and powerful new high-speed aircraft during the 1920s and '30s. In this richly illustrated account, acclaimed historian of aviation Roger E. Bilstein combines the story of NACA and NASA to provide a fresh look at the agencies, the problems they faced, and the hard work as well as inventive genius of the men and women who found the NACA research during World War II led to critical advances in U.S. fighter and bomber design and, Bilstein explains, contributed to engineering standards for helicopters. After 1945 the agency's test pilots experimented with jet-powered aircraft, testing both human and technical limits in trying to break the so-called 'sound barrier.' In October 1958, when the launch of the Soviet Sputnik signaled the beginning of the space race, NACA formed the nucleus of the new National Aeronautics and Space Agency. The new agency's efforts to meet President Kennedy's challenge-safely landing a

man on the Moon and returning him to Earth before the end of the 1960s-is one of the great adventure stories of all time. Bilstein goes on to describe NASA's recent planetary and extraplanetary exploratory, as well as its less well-known research into the future of aeronautical design.
Derived from text
Human Beings; Military Operations; Aircraft Design; Bomber Aircraft; Fabrication

20040046947 Defence Science and Technology Organisation, Edinburgh, Australia
Investigating Web Map Service Client Technologies
Blyth, Joel; Geoghegan, Sean; ODea, Damian; January 2004; 43 pp.; In English
Report No.(s): DSTO-TN-0536; DODA-AR-013-009; Copyright; Avail: Other Sources

Web Map Services may provide some assistance in alleviating the high cost of providing Geospatial Information System (GIS) capabilities to Defence users. This report discusses the development of several implementations of client applications of the Web Map Service interface. Problems encountered in the use of various Web technologies to construct the client applications are detailed. Suggestions are also made for future development efforts to improve client functionality.
Author
Information Systems; Technology Assessment; Websites

20040047021 Maribor Univ., Maribor, Slovenia
Procedure for Estimation of Error-rate of Classification Algorithms
Brumen, Bostjan; Golob, Izidor; Welzer, Tatjana; Druzovec, Marjan; Jaakkola, Hannu; Electrotechnical Review, Volume 70, No. 1-2; 2003, pp. 34-39; In Slovene; See also 20040047018; Copyright; Avail: Other Sources

To accomplish data mining, several techniques have been devised or reintroduced. One of these techniques is classification. A generated model can classify a record into a wrong class. The number of misclassified records versus the total number of records is the classification error of the induced model. A plot of the error rate versus the sample size (number of records used) is called a learning curve. To build a learning curve, we need to repeatedly measure the performance as the amount of training records increases. For this reason we modified the incremental k-fold cross-validation. In order to observe the learning curve, we need to be able to describe it. A learning curve can be described by a generic function e = f(n), where e denotes the performance and n the number of records in a training set. We added the constant a because we believe that the learning algorithm never acquires 100% accuracy (0% error) on the data.
Author (revised)
Data Mining; Classifications; Error Analysis

20040047281 NASA Marshall Space Flight Center, Huntsville, AL, USA
Overview of Future of Probabilistic Methods and RMSL Technology and the Probabilistic Methods Education Initiative for the US Army at the SAE G-11 Meeting
Singhal, Surendra N.; October 06, 2003; 1 pp.; In English; SAE G-11 RMSL Meeting, 1-3 Mar. 2004, Picatinny Arsenal, NJ, USA; No Copyright; Avail: Other Sources; Abstract Only

The SAE G-11 RMSL Division and Probabilistic Methods Committee meeting sponsored by the Picatinny Arsenal during March 1-3, 2004 at Westin Morristown, will report progress on projects for probabilistic assessment of Army system and launch an initiative for probabilistic education. The meeting features several Army and industry Senior executives and Ivy League Professor to provide an industry/government/academia forum to review RMSL technology; reliability and probabilistic technology; reliability-based design methods; software reliability; and maintainability standards. With over 100 members including members with national/international standing, the mission of the G-11s Probabilistic Methods Committee is to enable/facilitate rapid deployment of probabilistic technology to enhance the competitiveness of our industries by better, faster, greener, smarter, affordable and reliable product development.
Author
Education; Probability Theory

20040050181
Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide
Elkins, G. E.; Schmalzer, P.; Thompson, T.; Simpson, A.; Nov. 2003; 176 pp.; In English
Report No.(s): PB2004-104477; No Copyright; Avail: CASI; A09, Hardcopy

This document provides information to aid in understanding and using the Long-Term Pavement Performance (LTPP)

program pavement performance database. This document provides an introduction to the structure of the LTPP program, the relational structure of the LTPP database, a description of the location of various data elements, contents of the data table, tips on efficient means of manipulating data for specific types of investigations, how to obtain data, and example Structured Query Language (SQL) scripts that can be used to build user-defined custom extractions.
NTIS
Management Information Systems; Pavements

20040050228 State Univ. of New York, Buffalo, NY, USA, State Univ. of New York, Buffalo, NY, USA
Proceedings of the Workshop on Lessons from the World Trade Center Terrorist Attack: Management of Complex Civil Emergencies and Terrorism-Resistant Civil Engineering Design
Bruneau, M.; Oct. 18, 2002; 180 pp.; In English, June 24 - 25, 2002, New York, New York
Report No.(s): PB2004-100676; MCEER-02-SP08; No Copyright; Avail: CASI; A09, Hardcopy

The objectives of the workshop were to review whether knowledge developed during the past decades to enhance seismic resilience can be used to help achieve terrorism resistant communities, and at the same time, investigate whether lessons can be learned from blast-resistant engineering to enhance earthquake engineering practice. Furthermore, the workshop examined the management of complex civil emergencies and terrorism-resistant civil engineering design. Organizers sought participation of experts from throughout the country, to provide the multidisciplinary perspectives required to address this very complex problem. The workshop aimed to answer three questions using the expert opinion of the participants: Can some of the mitigation and emergency response procedures and tools in place to enhance earthquake resilience of the infrastructure be used to enhance resilience against a terrorist attack; Can some of the mitigation and emergency response procedures and tools in place to enhance resilience of the infrastructure against a terrorist attack be used to enhance earthquake resilience; What common procedures and tools are needed to provide resilience to both hazards.
NTIS
Terrorism; Structural Engineering; Emergencies

20040050694 Academy of Health Sciences (Army), Fort Sam Houston, TX
A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System
Wilhelm, Robert J.; Apr. 23, 2002; 73 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420975; No Copyright; Avail: CASI; A04, Hardcopy

The Defense Department uses the Medical Expense and Performance Reporting System (MEPRS) to perform analyses in support of best business practices. As part of MEPRS, the Uniform Chart of Accounts Personnel Utilization System (UCAPERS) issued to record manpower utilization data. Data quality is critical to ensure that accurate and timely data is available to decision makers. The quality of the data depends on the accuracy of the input and on the level of understanding of the process. The purpose of this study is to conduct a process analysis of UCAPERS and to assess the level of the standardization of reporting by providers responsible for the data input. The results show that UCAPERS is a complex process that is subject to varying degrees of interpretation. This appears true both among providers and MEPRS managers. Additionally, there is a wide variance in the reporting of certain categories of activities both among junior and senior officers. The author author's recommendations include: a web- based program to educate the personnel responsible for data capture, the development of a standardized format for data capture, and the development of an automated method for the daily capture of UCAPERS data to enhance data quality.
DTIC
Charts; Data Acquisition; Data Management; Medical Services; Military Operations; Personnel

20040050709 Office of Naval Research, Arlington, VA
Science and Technology Text Mining: Nonlinear Dynamics
Kostoff, Ronald N.; Shlesinger, Michael F.; Tshiteya, Rene; Feb. 2004; 192 pp.; In English; Original contains color illustrations
Report No.(s): AD-A420998; No Copyright; Avail: CASI; A09, Hardcopy

Database Tomography (DT) is a textual database analysis system consisting of two major components: 1) algorithms for extracting multi-word phrase frequencies and phrase proximities (physical closeness of the multi-word technical phrases) from any type of large textual database, to augment 2) interpretative capabilities of the expert human analyst. DT was used to derive technical intelligence from an Nonlinear Dynamics database extracted from the combined Science Citation Index (SCI)/ Social Science Citation Index (SSCI), hereafter referred to as SCI. Phrase frequency analysis by the technical domain experts

provided the pervasive technical themes of the Nonlinear Dynamics database, and the phrase proximity analysis provided the relationships among the pervasive technical themes. Bibliometric analysis of the Nonlinear Dynamics literature supplemented the DT results with author/ journal/ institution publication and citation data.
DTIC
Algorithms; Data Bases; Grammars; Nonlinearity; Research and Development; Technologies; Texts

20040050728 Army War Coll., Carlisle Barracks, PA
US National Security and Strategy. A Selected Bibliography
Feb. 2004; 43 pp.; In English
Report No.(s): AD-A421031; No Copyright; Avail: CASI; A03, Hardcopy
No abstract available
Bibliographies; Military Operations; Security; Strategy

20040050735 Best Mfg. Practices Center of Excellence, College Park, MD
Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA
Jun. 2003; 31 pp.; In English
Report No.(s): AD-A421040; No Copyright; Avail: CASI; A03, Hardcopy
With the Web in its early stages and the insight for the potential of Internet technology two software arebitects formed ABC Virtual Communications, Inc. (ABCV) in 1995. Located in West Des Moines, Iowa, ABCV has helped companies extend the reach of their enterprises through Web- Centric technologies, and has become the Internet software development and consulting company of choice focusing its expertise, skill, and knowledge on Internet-based e-Busi- ness products and services. ABCV targets medium to large-sized companies where great demands for practical, cost-effective, and timely solutions are a reality ABC virtual is also involved with several regional trade associations such as the Mortgage Brokers Association of America and Software and Information Technology of Iowa.
DTIC
Computer Programming; Internets; Manufacturing; Software Engineering; Surveys

20040050752 Office of Naval Research, Arlington, VA
Science and Technology Text Mining: Strategic Management and Implementation in Government Organization
Kostoff, Ronald N.; Geisler, Eliezer; Mar. 2004; 64 pp.; In English
Report No.(s): AD-A421060; No Copyright; Avail: CASI; A04, Hardcopy
This report focuses on the strategic role and the implementation of textual data mining (TDM) in government organizations, with special emphasis on TDM to support the management of science and technology (S&T). It begins by defining TDM, and discussing the strategic management process in federal government organizations and the role of TDM as an integral part of this process. The report then proceeds to describe some of the uses and applications of TDM. The results of a demonstration program by the U.S. Office of Naval Research show some potential benefits from TDM: (1) integration of national and multi-national S&T databases; (2) supporting strategic decisions on the direction and funding of government S&T; and (3) creation of usable S&T databases to support strategic decisions in other areas of government. Implications of the demonstration program relative to larger scale implementation of TDM are discussed. The report ends with a description of the principles and requirements of higher quality TDM studies. The appendix describes conceptually how a college-based TDM training program could be implemented.
DTIC
Information Retrieval; Research and Development; Technologies; Texts

20040050764 Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD
Quantitative Infrared Reference Library. Library 2
Ditillo, John; Keiser, Christopher C.; Williams, Barry R.; Dec. 2003; 72 pp.; In English
Report No.(s): AD-A421080; ECBC-TR-360; No Copyright; Avail: CASI; A04, Hardcopy
Recent technology developments in Fourier Transform Infrared (FTIR) spectroscopy, such as stand-off infrared detection of chemical agents and related compounds for monitoring applications, has created a need for condensed and vapor phase FTIR databases which utilize current technology. Old infrared databases are obsolete as they were collected on first generation instruments with poor signal-to- noise characteristics arising from a variety of instrumental variations (such as noisy ND

converters, wavelength calibration problems, etc.) relative to the capabilities of present day FTlR instrumentation. In addition, commercial infrared spectra compilations do not adequately address militarily significant, or directly related, compounds. The objective of this effort is to create, validate, and maintain a vapor phase FTIR database, with a focus on compounds of military significance or potential terrorist threat, using instrumentation that reflects current analytical capabilities.
DTIC
Data Bases; Fourier Transformation; Infrared Radiation; Libraries; Spectroscopy

20040050770 Center for Naval Analyses, Alexandria, VA
Officer Street-to-Fleet Database: Expanding Capabilities
Parcell, Ann D.; Maitrejean, John; Sullivan, Donna; Oct. 2003; 50 pp.; In English; Original contains color illustrations
Contract(s)/Grant(s): N00014-00-0700; Proj-R0148
Report No.(s): AD-A421094; CAB-D0009053.A4; No Copyright; Avail: CASI; A03, Hardcopy

Officer Street-to-Fleet Database: Expanding Capabilities is a follow-on study sponsored by N81. In the earlier study, the sponsor asked us to develop a database for officers that merged training files with personnel files in order to calculate time-to-train to first assignment (TTT) metrics for officer communities. The result was the beginning of the Officer Street-to-Fleet (OSTF) database. In this study, we calculated TTT metrics for pilots and NFOs by specific training pipeline, identified some areas of concern for NFO attrition, extended our TTT calculations to the large restricted line (RL) communities, and expanded the database to include officer accessions from FY 1993 to FY 2002. (U) We found that average TTT fell for all aviation training pipelines since FY 1993 but that attrition rose slightly for most pipelines over the same period. In particular helicopter training attrition rose substantially for the FY 1996 and FY 1997 accession cohorts. We also found that the increase in NFO attrition is related to an increase in the number of OCS accessions, historically an accession source with high attrition rates. Finally, we found recent decreases in average TTT in RL communities.
DTIC
Data Bases; Personnel; Streets

20040050793 Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD
Brillouin Spectroscopy Data Base for Biological Threats
Rubel, Glenn O.; Fung, Kwok H.; Dec. 2003; 17 pp.; In English
Report No.(s): AD-A421126; ECBC-TR-356; No Copyright; Avail: CASI; A03, Hardcopy

Brillouin scattering from biological materials is conducted using a tandem Fabry-Perot interferometer. The interferometer is uniquely designed to measure small frequency shifts that are characteristic of Brillouin scattering. Brillouin scattering from DNA, ovalbumen, the Bacillus spores globigii and thuringiensis were measured to determine the feasibility of biological material discrimination using Brillouin scattering. It was found that all biological materials exhibited unique Brillouin spectra and that it was possible to discern Bacillus spores at the species level. It is concluded that Brillouin spectroscopy has great potential as an optical tool for the detection and discrimination of threat biological materials. The only limitation in this approach is that the cross sections are small, and the tool is best suited for either point detection or short distance remote detection.
DTIC
Bacillus; Biological Effects; Data Bases; Detection; Fabry-Perot Interferometers; Remote Sensing; Spectroscopy

83
ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

20040046980 Idaho National Engineering Lab., Idaho Falls, ID, USA
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features
Winter, J. W.; Corletti, M. M.; Hayashi, Y.; Nov. 2003; 68 pp.; In English
Report No.(s): DE2003-817028; DOE/SF/22170; No Copyright; Avail: Department of Energy Information Bridge

On December 16, 1999, The USA Nuclear Regulatory Commission issued Design Certification of the AP600 standard nuclear reactor design. This culminated an 8-year review of the AP600 design, safety analysis and probabilistic risk assessment. The AP600 is a 600 MWe reactor that utilizes passive safety features that, once actuated, depend only on natural forces such as gravity and natural circulation to perform all required safety functions. These passive safety systems result in increased plant safety and have also significantly simplified plant systems and equipment, resulting in simplified plant

operation and maintenance. The AP600 meets NRC deterministic safety criteria and probabilistic risk criteria with large margins.
NTIS
Nuclear Power Plants; Safety Management; Nuclear Reactors; Safety Factors

20040050245 Massachusetts Inst. of Tech., Cambridge, MA, USA
Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation
Miller, David W.; Uebelhart, Scott A.; Blaurock, Carl; January 2004; 46 pp.; In English
Contract(s)/Grant(s): NAG1-01025; No Copyright; Avail: CASI; A03, Hardcopy

This report summarizes work performed by the Space Systems Laboratory (SSL) for NASA Langley Research Center in the field of performance optimization for systems subject to uncertainty. The objective of the research is to develop design methods and tools to the aerospace vehicle design process which take into account lifecycle uncertainties. It recognizes that uncertainty between the predictions of integrated models and data collected from the system in its operational environment is unavoidable. Given the presence of uncertainty, the goal of this work is to develop means of identifying critical sources of uncertainty, and to combine these with the analytical tools used with integrated modeling. In this manner, system uncertainty analysis becomes part of the design process, and can motivate redesign. The specific program objectives were: 1. To incorporate uncertainty modeling, propagation and analysis into the integrated (controls, structures, payloads, disturbances, etc.) design process to derive the error bars associated with performance predictions. 2. To apply modern optimization tools to guide in the expenditure of funds in a way that most cost-effectively improves the lifecycle productivity of the system by enhancing the subsystem reliability and redundancy. The results from the second program objective are described. This report describes the work and results for the first objective: uncertainty modeling, propagation, and synthesis with integrated modeling.
Author
Reliability; Systems Analysis; Performance Prediction; Degradation; Aerospace Vehicles

88
SPACE SCIENCES (GENERAL)

Includes general research topics related to the natural space sciences. For specific topics in space sciences see *categories 89 through 93*.

20040051074 George Washington Univ., Washington, DC, USA
A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts
Sandusky, Robert; [2002]; 5 pp.; In English
Contract(s)/Grant(s): NCC1-387; No Copyright; Avail: CASI; A01, Hardcopy

Since its inception in December 1999, the program has provided support for a total of 11 Graduate Research Scholar Assistants, of these, 6 have completed their MS degree program. The program has generated 3 MS theses and a total of 4 publications/presentations.
Derived from text
Aerospace Systems; Education; Research; Design Optimization

89
ASTRONOMY

Includes observations of celestial bodies; astronomical instruments and techniques; radio, gamma-ray, x-ray, ultraviolet, and infrared astronomy; and astrometry.

20040046921 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA
Shocked Clouds in the Vela Supernova Remnant
Nichols, Joy S.; Slavin, Jonathan D.; [2004]; 45 pp.; In English
Contract(s)/Grant(s): NAG5-8483; No Copyright; Avail: CASI; A03, Hardcopy

Unusually strong high-excitation C I has been detected in eleven lines of sight through the Vela supernova remnant by means of UV absorption-line studies of IUE data. Most of these lines of sight lie near the western edge of the X-ray bright

region of the supernova remnant in a spatially distinct band approximately 1deg by 4deg oriented approximately north/south. The high-excitation C I (denoted C I*) is interpreted as evidence of a complex of shocked dense clouds inside the supernova remnant, due to the high pressures indicated in this region. To further analyze the properties of this region of C I*, we present new HIRES-processed IRAS data of the entire Vela SNR. A temperature map calculated from the HIRES IRAS data, based on a two-component dust model, reveals the signature of hot dust at several locations in the SNR. The hot dust is anti-correlated spatially with X-ray emission as revealed by ROSAT, as would be expected for a dusty medium interacting with a shock wave. The regions of hot dust are strongly correlated with optical filaments, supporting a scenario of dense clouds interior to the SNR that have been shocked and are now cooling behind the supernova blast wave. With few exceptions, the lines of sight to the strong C I* pass through regions of hot dust and optical filaments. Possible mechanisms for the production of the anomalously large columns of C I and C I* are discussed. Dense clouds on the back western hemisphere of the remnant may explain the relatively low X-ray emission in the western portion of the Vela supernova remnant due to the slower forward shock velocity in regions where the shock has encountered the dense clouds. An alternate explanation for the presence of neutral, excited state, and ionized species along the same line of sight may be a magnetic precusor that heats and compresses the gas ahead of the shock.
Author
Supernova Remnants; Excitation; Clouds; X Rays; Absorption Spectra; Detonation Waves; Shock Waves

20040050203 Lawrence Livermore National Lab., Livermore, CA
LOTIS Upper Limits and the Prompt OT from GRB 990123
Williams, G. G.; Hartmann, D. H.; Park, H. S.; Porrata, R. A.; Ables, E.; Aug. 10, 2000; 12 pp.; In English
Report No.(s): DE2004-15006145; UCRL-JC-141126; No Copyright; Avail: Department of Energy Information Bridge

GRB 990123 established the existence of prompt optical emission from gamma-ray bursts (GRBs). The Livermore Optical Transient Imaging System (LOTIS) has been conducting a fully automated search for this kind of simultaneous low energy emission from GRBs since October 1996. Although LOTIS has obtained simultaneous, or near simultaneous, coverage of the error boxes obtained with BATSE, IPN, XTE, and BeppoSAX for several GRBs, image analysis resulted in only upper limits. The unique gamma-ray properties of GRB 990123, such as very large fluence (top 0.4%) and hard spectrum, complicate comparisons with more typical bursts. We scale and compare gamma-ray properties, and in some cases afterglow properties, from the best LOTIS events to those of GRB 990123 in an attempt to determine whether the prompt optical emission of this event is representative of all GRBs. Furthermore, using LOTIS upper limits in conjunction with the relativistic blast wave model, we weakly constrain the GRB and afterglow parameters such as density of the circumburster medium and bulk Lorentz factor of the ejecta.
NTIS
Gamma Ray Bursts; Light Emission

20040050284 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption
Lines, Nichols J.; Slavin, J.; Anderson, C.; [2001]; 10 pp.; In English; AAS Meeting, 1999
Contract(s)/Grant(s): NAG5-8483; No Copyright; Avail: CASI; A02, Hardcopy

Highly ionized gas, in particular C IV and O VI, is produced in the interstellar medium in regions with hot (T approx. 10(exp 6) K) X-ray emitting gas and at the boundaries where hot gas and cooler (T approx. 10(exp 4) K) gas interact. Supernova remnant shocks produce most of the hot gas in the ISM and, if they are in the correct range of speeds, should produce observable quantities of C IV and O VI absorption. In turn, the column densities of these ions are potentially powerful diagnostics of the shock speed and interstellar environment in which the SNR is evolving. With the advent of FUSE, the power of this diagnostic technique is now available. We have FUSE data toward 8 stars behind the Vela SNR, and have developed a data reduction and analysis method that produces reasonably reliable O VI column densities, in spite of the complexities of the FUSE spectra in this region. In order to gain insight into the observational results, the Vela SNR evolution was modelled using Piecewise Parabolic Method numerical hydrodynamics code. The code is 1-D and incorporates non-equilibrium ionization, radiative cooling, thermal conduction and magnetic pressure.
Author
Supernova Remnants; Ionized Gases; High Temperature Gases; Absorption Spectra

20040050358 Lawrence Livermore National Lab., Livermore, CA
Using Data Mining to Find Bent-double Galaxies in the FIRST Survey
Kamath, C.; Cantu-Paz, E.; Fodor, I. K.; Tang, N.; Jun. 22, 2001; 16 pp.; In English
Report No.(s): DE2004-15006299; UCRL-JC-143458; No Copyright; Avail: Department of Energy Information Bridge

In this paper, the authors describe the use of data mining techniques to search for radio-emitting galaxies with a bent-double morphology. In the past, astronomers from the FIRST (Faint Images of the Radio Sky at Twenty-cm) survey identified these galaxies through visual inspection. This was not only subjective but also tedious as the on-going survey now covers 8000 square degrees, with each square degree containing about 90 galaxies. In this paper, they describe how data mining can be used to automate the identification of these galaxies. They discuss the challenges faced in defining meaningful features that represent the shape of a galaxy and their experiences with ensembles of decision trees for the classification of bent-double galaxies.
NTIS
Galaxies; Radio Galaxies; Data Processing

20040050609 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Evolution of Galaxies and the Star Formation Rate in the Infrared
Pahre, Michael A.; Oliversen, Ronald J., Technical Monitor; March 2004; 6 pp.; In English
Contract(s)/Grant(s): NAG5-10777
Report No.(s): Rept-3; No Copyright; Avail: CASI; A02, Hardcopy

A central goal of extragalactic observational astronomy is to understand how normal galaxies evolve with redshift, and particularly when galaxies formed their stars. While optical and rest-frame UV observations have begun to address these issues, the interpretation of such data is particularly challenging because of the sensitivity to dust obscuration (at optical and UV wavelengths). The absorbed light is reradiated at IR wavelengths, hence the optimal indicators of the star-formation rate (SFR) is at a rest-frame wavelength of approx. 60 microns. The Spitzer Space Telescope mission is beginning to revolutionize the study of the global properties and evolution of galaxies. Spitzer reaches nearly two orders of magnitude more sensitivity than previous IR space missions. This research program is to study the SFR using statistical samples of galaxies in the local universe, at intermediate redshifts, and set the stage for continuing studies up to z=5. The overall research program is divided into three main investigations: A Mid-IR Hubble Atlas and SFR estimators in the local universe, Evolution of the SFR at $0 < z < 1$ using pencil beam redshift surveys, and Galaxy formation and evolution at $1 < z < 5$. The Spitzer Space Telescope launched during the past year and the first papers from it are currently being submitted to The Astrophysical Journal. This is clearly an exciting time for IR astronomy!
Author
Galactic Evolution; Infrared Astronomy; Space Infrared Telescope Facility; Star Formation Rate

90
ASTROPHYSICS

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.

20040045249 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034
Greenhill, Lincoln J.; March 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG5-13355; No Copyright; Avail: CASI; A01, Hardcopy

The target galactic nucleus is ostensibly 'normal,' but the presence of water maser emission indicates that it may be an obscured AGN. Our primary goal has been to test this hypothesis through the detection hard X-ray emission and an X-ray spectrum characteristic of heavy absorption. The data for this program became available in May 2003. Light curves show that most of the data are good and that the background was well behaved. We have constructed images and found the X-ray emission in this target is a hard and may be extended. The presence of an AGN has been confirmed through observation with XMM. This is one of many edge-on normal galaxies that may contain AGN. The orientation of the extension will be compared to the structure of molecular gas observed at high angular resolution with VLBI. These radio observations were completed in August 2003. Correlation was completed in late 2003. The data have yet to be delivered by the ATNF. Since the start of the program, we have also obtained six radio spectra, on top of the two obtained at or close to the epoch of discovery for the maser. Early indications were that the maser emission exhibited unusually broad velocity extent and that it 'jumped in velocity on time scales of weeks. This behavior has been speculated to be the signature of emission excited by jet-ISM interactions. After more extensive and more sensitive radio study, we find that (1) the emission does not in fact change velocity centroid substantially and (2) it comprises narrower, more 'normal' emission features. The joint interpretation of radio and XMM data will be possible once the VLBI images and position-resolved X-ray spectra have been made, probably in summer 2004. If the radio emission arises in an accretion disk, rather than a jet, then we may predict that the VLBI images will exhibit

velocity-position gradients orthogonal to the extension of X-ray emission, which presumably traces an optical narrow line or outflow region.
Derived from text
Galactic Nuclei; Galaxies; X Ray Spectra; Emission; Absorption

20040045261 Massachusetts Inst. of Tech., Cambridge, MA, USA
Accreting Neutron Stars as Astrophysical Laboratories
Chakrabarty, Deepto; [2004]; 3 pp.; In English
Contract(s)/Grant(s): NAG5-9184; No Copyright; Avail: CASI; A01, Hardcopy

In the last year, we have made an extremely important breakthrough in establishing the relationship between thermonuclear burst oscillations in accreting neutron stars and the stellar spin. More broadly, we have continued t o make significant scientific progress in all four of the key focus areas identified in our original proposal: (1) the disk-magnetosphere interaction in neutron stars, (2) rapid variability in accreting neutron stars, (3) physics of accretion flows, and (4) fundamental properties of neutron stars. A list of all publications that have arising from this work since the start of our program is given.
Author
Bursts; Oscillations; Neutron Stars

20040045265 Vanderbilt Univ., Nashville, TN, USA
A Study of Ion Outflow as a Source of Plasma for the Magnetosphere
Chappell, Charles R.; June 20, 2003; 16 pp.; In English
Contract(s)/Grant(s): NAG5-8618; No Copyright; Avail: CASI; A03, Hardcopy

Spacecraft measurements beginning in the early 1970 s gave indications that the ionosphere was a contributor to the energetic particle population of the Earth s magnetosphere This surprising result ran counter to the previously accepted model that the magnetospheric plasmas, because of their higher energies, must have come from the solar wind. Indeed, the original discovery of the Van Allen radiation belts, with energies of millions of electron volts, set a strong community belief in the sun as the plasma source because of the dramatic difference in the radiation belt energy and that of the Earth s ionospheric source.
Derived from text
Ion Injection; Plasmas (Physics); Magnetospheres; Energetic Particles; Earth Magnetosphere

20040045309 Science Applications International Corp., San Diego, CA, USA
Magnetohydrodynamic Modeling of Coronal Evolution and Disruption
Linker, Jon; August 12, 2002; 5 pp.; In English
Contract(s)/Grant(s): NASW-01005
Report No.(s): SAIC-03/8011:APPAT-320; Rept-01-0157-04-1047-100; No Copyright; Avail: CASI; A01, Hardcopy

Flux cancellation, defined observationally as the mutual disappearance of magnetic fields of opposite polarity at the neutral line separating them, has been found to occur frequently at the site of filaments (called prominences when observed on the limb of the Sun). During the second year of this project, we have studied theoretically the role that flux cancellation may play in prominence formation, prominence eruption, and the initiation of coronal mass ejections. This work has been in published in two papers: 'Magnetic Field Topology in Prominences' by Lionello, Mikic, Linker, and Amari and 'Flux Cancellation and Coronal Mass Ejections' by Linker, Mikic, Riley, Lionello, Amari, and Odstrcil.
Author
Magnetohydrodynamics; Coronas; Evolution (Development); Disrupting; Coronal Mass Ejection; Mathematical Models

20040046898 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1
Mushotsky, Richard, Technical Monitor; Slane, Patrick; March 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG5-10017; No Copyright; Avail: CASI; A01, Hardcopy

The subject grant is for analysis of XMM data from the supernova remnant CTA1. Our investigation centered on the study of the compact source RX 50007.0+7302 that, based on our previous observations, appears to be a neutron star powering a wind nebula in the remnant interior. This compact source has also been suggested as the counterpart of the EGRET source 2EG J0008+7307. The analysis of the data from the compact source is complete. We find that the spectrum of the source is well described by a power law with the addition of a soft thermal component that may correspond to emission from hot polar cap regions or to cooling emission from a light element atmosphere over the entire star. There is evidence of extended emission

on small spatial scales which may correspond to structure in the underlying synchrotron nebula. Extrapolation of the nonthermal emission component to gamma-ray energies yields a flux that is consistent with that of 2EG J0008+7307, thus strengthening the proposition that there is a gamma-ray emitting pulsar at the center of CTA 1. Our timing studies with the EPIC pn data revealed no evidence for pulsations, however; we set an upper limit of 61% on the pulsed fraction from this source. The results from this study were presented.
Author
Polar Caps; Data Processing; Supernova Remnants; Neutron Stars

20040046911 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap
Brinton, John C., Technical Monitor; Silver, Eric, et al.; March 2004; 3 pp.; In English
Contract(s)/Grant(s): NAG5-5362; No Copyright; Avail: CASI; A01, Hardcopy

During the past year we have been preparing our new microcalorimeter system for permanent delivery to the NIST EBIT. Unfortunately, there have been delays due to technical difficulties in the fabrication of the two-stage adiabatic demagnetization refrigerator and in the life expectancy of the thin windows used for internal thermal baffling of the infrared radiation. These problems have been solved and we are completing tests of the entire system and it will be set up at NIST during the first week of May. Several photos of the new system are shown in Figures 1A and 1B. This microcalorimeter spectrometer only requires helium refills every three days (as opposed to every 24 hours) and it will hold a temperature! of 65 mK for up to 48 hours (as opposed to 8 hours). Consequently, the efficiency of data acquisition will improve dramatically. In parallel we have published a paper that reviews our previous work (Takacs et al. 2003), especially on Fe XVII, in the context of recent measurements by other groups. This paper is included. We highlight a recent measurement of a broad band spectrum of Fe in Figure 2 that simultaneously includes L and K radiation. It is compared with the simulated spectrum of the Perseus Cluster that one could expect to obtain with a microcalorimeter in the focus of a grazing incidence telescope such as the one being designed for Constellation X. Both the charge state distributions and the relative intensity ratios of the emission lines within the particular charge state are very similar in the two spectra. This further demonstrates the importance and relevance of the laboratory measurements in predicting the components of cosmic spectra.
Derived from text
Astrophysics; Bragg Angle; Calorimeters; Electron Beams; Spectrometers; Ion Beams

20040046915 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Over-Luminous Elliptical Galaxies
Mushotsky, Richard, Technical Monitor; Forman, William; March 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG5-12931; No Copyright; Avail: CASI; A01, Hardcopy

We have completed a first draft of a paper on the galaxy group ESO3060170, the hottest known fossil group. We have submitted a first draft of the paper but the final completion is delayed due to several issues mentioned by the referee that we wish to revisit and discuss in more detail. The XMM data was combined with Chandra data which allowed a rich set of projects. The paper discusses the north-south elongation which is similar to that of the central dominant galaxy as well as the galaxy distribution. We detect an X-ray 'finger' or small tail emanating from the central galaxy to the north, suggesting motion of the galaxy within the elongated gravitational potential. The overall agreement between XMM and Chandra data are excellent (although the XMM data extend to larger radii). Both data sets show a cool core centered on the dominant galaxy. Surprisingly, - the temperature maps and detailed spectra indicate that the finger of gas is NOT cool, but has the same temperature as the ambient gas. We extracted surface brightness profiles, deprojected gas density profiles, cooling time profiles, and entropy profiles. There is a sharp discontinuity in gas temperature where the surface brightness profile starts to rise rapidly at 10 kpc. This produces a decrease in the cooling time and the gas entropy within 10 kpc. The central cooling time (within 10 kpc) is less than 109 years and falls to almost half that value in the inner 5 kpc. Despite the very short cooling time, we find no evidence (even with the excellent statistics from XMM-Newton) for multi-phased gas, i.e., a cooling flow. We find two 'edges' associated with the gas distribution (common in peaked X-ray groups and galaxies). On large scales, the temperature profile is flat and disagrees with the profile predicted by Loken et al. (2003) from detailed numerical simulations. We studied the galaxy distribution within one virial radius. The galaxy concentration associated with the group is detectable only within 0.3 of the virial radius (450 kpc) given the available depth of the optical galaxy catalogs at present. We have derived total mass and gas mass distributions (from the X-ray data) and find the gas fraction approaches a constant 8% (for H0 = 70).
Author
Elliptical Galaxies; Galactic Clusters; Luminosity; X Ray Astronomy

20040046922 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA
High Velocity Gas in the Line of Sight to the Vela SNR
Nichols, Joy S.; Slavin, Jonathan D.; [2004]; 25 pp.; In English; Original contains black and white illustrations
Contract(s)/Grant(s): NAG5-8483; No Copyright; Avail: CASI; A03, Hardcopy

One of the best objects for study of the structure, kinematics, and evolutionary status of a middle-aged supernova remnant (SNR) is the VELA SNR, due to its proximity, extensive optical filamentary structure, and an abundance of hot background stars for absorption line research. The VELA remnant is 7.3 degrees in diameter, based on x-ray imagery with ROSAT, with the pulsar nearly centered in the remnant. The western region of the remnant has much lower x-ray surface brightness than the remainder of the remnant and in fact escaped earlier detection with previous instrumentation. The remnant is believed to be about 11,000 years old.
Author
High Speed; Gas Flow; Supernova Remnants; Line of Sight; Hot Stars

20040046995 Helsinki Univ. of Technology, Kylmaelae
Solar Millimeter Wave Bursts: Time-Frequency Analysis
Zaitsev, V.V.; Kislyakov, A.G.; Urpo, S.; Stepanov, A.V.; Shkelev, E.I.; 2003; In English
Report No.(s): PB2004-102207; HUT-MET-44; Copyright; Avail: National Technical Information Service (NTIS)

Analysis of low-frequency (LF) fluctuations of solar flare emission at 22 and 37 GHz is performed. Three microwave bursts observed at Metashovi Radio Observatory with the time resolution of 100 and 50 ms are investigated. To find time-frequency diagram for (LF)-pulsations the Fast Fourier Transform (FFT) and Wigner-Ville (WV) method are applied. As a result the dynamic spectra of LF-fluctuations were obtained for the first time, which were interpreted in terms of eigen oscillations of coronal magnetic loops (CML).
NTIS
Millimeter Waves; Solar Flares; Microwave Emission

20040047156 Massachusetts Inst. of Tech., Cambridge, MA, USA
Low-mass X-ray Binaries with RXTE
April 04, 2004; 1 pp.; In English
Contract(s)/Grant(s): NAG5-10815
Report No.(s): MIT-6892096; No Copyright; Avail: CASI; A01, Hardcopy

Below are the publications which directly and indirectly evolved from this very successful program: 1) 'Search for millisecond periodicities in type I X-ray bursts of the Rapid Burster'; 2) 'High-Frequency QPOs in the 2000 Outburst of the Galactic Microquasar XTE J1550-564'; 3) 'Chandra and RXTE Spectroscopy of Galactic Microquasar XTE 51550-564 in Outburst'; 4) 'GX 339-4: back to life'; 5) 'Evidence for black hole spin in GX 339-4: XMM-Newton EPIC-PN and RXTE spectroscopy of the very high state'.
Author (revised)
X Ray Binaries; X Ray Astronomy; Bursts; Quasars; X Ray Spectroscopy

20040047165 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap
Silver, Eric; March 2004; 16 pp.; In English
Contract(s)/Grant(s): NAG5-5362
Report No.(s): Rept-2; No Copyright; Avail: CASI; A03, Hardcopy

When we last reported, our new microcalorimeter system was being prepared for delivery and permanent installation at the NIST EBIT. This occurred in June 2003 and check-out with the internal calibration source and EBIT plasma x-rays took place over the next several months during which time we modified several component parts to improve the performance. These changes included: 1) A redesign of the x-ray calibration source from a direct electron impact source to one that irradiates the microcalorimeter with fluorescent x-rays. The resulting calibration lines are free of bremsstrahlung background; 2) The microcalorimeter electronic circuit has been significantly improved to ensure long-term stability for the lengthy upcoming runs of the EBIT. Both the preamplifier feedback resistors were changed and the first stage of the preamplifier redesigned. Several photos of the new system are shown in slides 3 and 4. This microcalorimeter spectrometer only requires helium refills every three days (as opposed to every 24 hours in our earlier system) and it will hold a temperature of 65 mK for up to 48 hours (as opposed to 8 hours). Consequently, the efficiency of data acquisition will improve dramatically. The first x-ray spectra of

the new calibration source made with the 4-element detector array is shown. An example of the temperature control capabilities of the ADR for a 23 hour interval is shown. The horizontal line shows the temperature stability (about +/- 3 micro kelvin). There are a few short-lived heating excursions caused by technical staff working on the EBIT machine simultaneously. During actual experimental runs these are absent. This temporal profile was interrupted to test additional components of the system; otherwise, the temperature controlling would have continued for another 24 hours.
Author (revised)
Astrophysics; Calorimeters; Spectrometers; Electron Beams; Ion Traps (Instrumentation)

20040047185 NASA Marshall Space Flight Center, Huntsville, AL, USA
Plans for Extreme Energy Cosmic Ray Observations from Space
Adams, James H., Jr.; [2004]; 1 pp.; In English; No Copyright; Avail: Other Sources; Abstract Only

Cosmic rays have been detected at energies beyond 10(exp 20) eV, where Universe is predicted to become opaque to protons. The acceleration of cosmic rays to such extreme energies in known astrophysical objects has also proven difficult to understand, leading to many suggestions that new physics may be required to explain their existence. This has prompted the construction of new experiments designed to detect cosmic rays with fluxes below 1 particle/km/century and follow their spectrum to even higher energies. To detect large numbers of these particles, the next generation of these experiments must be performed on space-based platforms that look on very large detection volumes in the Earth's atmosphere. The talk will review the experimental and theoretical investigations of extreme energy cosmic rays and discuss the present and planned experiments to extend measurements beyond 10(exp 21) eV.
Author
Cosmic Rays; Astrophysics; Energy Spectra; Universe; Earth Observations (From Space)

20040047273 Lawrence Livermore National Lab., Livermore, CA
Optical and EUV Light Curves of Dwarf Nova Outbursts
Mauche, C. W.; Mattei, J. A.; Bateson, F. M.; Nov. 15, 2000; 12 pp.; In English
Report No.(s): DE2004-15005767; UCRL-JC-141556; No Copyright; Avail: Department of Energy Information Bridge

We combine AAVSO and VSS/RASNZ optical and Extreme Ultraviolet Explorer EUV light curves of dwarf novae in outburst to place constraints on the nature of dwarf nova outbursts. From the observed optical-EUV time delays of(approx) 0.75-1.5 days, we show that the propagation velocity of the dwarf nova instability heating wave is (approx) 3 km s(sup -1).
NTIS
Dwarf Novae; Extreme Ultraviolet Radiation; Propagation Velocity

20040050199 Lawrence Livermore National Lab., Livermore, CA
Super-LOTIS Early Time Optical Counterpart Measurements
Park, H. S.; Porrata, R. A.; Williams, G. G.; Ables, E.; Band, D. L.; Aug. 10, 2000; 10 pp.; In English
Report No.(s): DE2004-15006146; UCRL-JC-141127; No Copyright; Avail: Department of Energy Information Bridge

We present an update on our ongoing effort to establish a dedicated observation program with an automated 0.6 meter telescope system that can detect GRB optical signals from 30 s to many hours after the start of the burst. The Super-LOTIS telescope has a 0.8 x 0.8(sup o) field-of-view, is sensitive to V 17(approx) 19 objects, depending on the integration times, and will be placed at the Kitt Peak National Observatory. This paper presents technical aspects of this telescope and first results from initial operations at LLNL. Utilizing real-time coordinates from BATSE, BeppoSAX, XTE, IPN, HETE-2 and INTEGRAL, our LOTIS and SLOTIS systems will measure prompt GRB optical light curves that will enhance our understanding of GRBs.
NTIS
Telescopes; Gamma Ray Bursts; Optical Communication

20040050223 NASA Marshall Space Flight Center, Huntsville, AL, USA
The Mystery of Gamma-Ray Bursts
Fishman, Gerald J.; January 2004; 1 pp.; In English; Rice University 'Space Exploration Series', 22 Mar. 2004, Houston, TX, USA; No Copyright; Avail: Other Sources; Abstract Only

Gamma-ray bursts remain one of the greatest mysteries in astrophysics. Observations of gamma-ray bursts made by the BATSE experiment on the Compton Gamma-Ray Observatory will be described. Most workers in the field now believe that they originate from cosmological distances. This view has been reinforced by observations this year of several optical

afterglow counterparts to gamma-ray bursts. A summary of these recent discoveries will be presented, along with their implications for models of the burst emission mechanism and the energy source of the bursts.
Author
Gamma Ray Bursts; Cosmology; Astrophysics

20040050246 NASA Marshall Space Flight Center, Huntsville, AL, USA
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24
Becker, Werner; Swartz, Douglas A.; Pavlov, George G.; Elsner, Ronald F.; Grindlay, Jonathan; Mignani, Roberto; Tennant, Allyn F.; Backer, Don; Pulone, Luigi; Testa, Vincenzo, et al.; September 10, 2003; 14 pp.; In English
Contract(s)/Grant(s): NAG5-10865; Copyright; Avail: Other Sources

We report here the results of the first Chandra X-Ray Observatory observations of the globular cluster M28 (NGC 6626). We detect 46 X-ray sources, of which 12 lie within 1 core radius of the center. We show that the apparently extended X-ray core emission seen with the ROSAT HRI is due to the superposition of multiple discrete sources, for which we determine the X-ray luminosity function down to a limit of about 6 x 10(exp 30) ergs/s. We measure the radial distribution of the X-ray sources and fit it to a King profile finding a core radius of r(sub c,X) approx. = 5 11‘. We measure for the first time the unconfused phase-averaged X-ray spectrum of the 3.05 ms pulsar B1821-24 and find that it is best described by a power law with photon index Gamma approx. = 1.2. We find marginal evidence of an emission line centered at 3.3 keV in the pulsar spectrum, which could be interpreted as cyclotron emission from a corona above the pulsar s polar cap if the magnetic field is strongly different from a centered dipole. The unabsorbed pulsar flux in the 0.1 - 8.0 keV band is approx. = 3.5 x 10(exp -13) ergs/s sq cm. We present spectral analyses of the five brightest unidentified sources. Based on the spectral parameters of the brightest of these sources, we suggest that it is a transiently accreting neutron star in a low-mass X-ray binary, in quiescence. Fitting its spectrum with a hydrogen neutron star atmosphere model yields the effective temperature T(sub eff, sup infinity) = 90(sup +30, sub -10) eV and the radius R(sub NS, sup infinity) = 14.5(sup +6.9, sub -3.8) km. In addition to the resolved sources, we detect fainter, unresolved X-ray emission from the central core. Using the Chandra-derived positions, we also report on the result of searching archival Hubble Space Telescope data for possible optical counterparts.
Author
Globular Clusters; Pulsars; X Ray Sources; X Ray Binaries; Magnetic Fields

20040050277 Lawrence Livermore National Lab., Livermore, CA
Prompt GRB Optical Follow-up Experiments
Park, H. S.; Williams, G.; Ables, E.; Band, D.; Barthelmy, S.; Nov. 13, 2000; 14 pp.; In English
Report No.(s): DE2004-15006129; UCRL-JC-141466; No Copyright; Avail: Department of Energy Information Bridge

Gamma Ray Bursts (GRBs) are brief, randomly located, releases of gamma-ray energy from unknown celestial sources that occur almost daily. The study of GRBs has undergone a revolution in the past three years due to an international effort of follow-up observations of coordinates provided by Beppo/SAX and IPN GRB. These follow-up observations have shown that GRBs are at cosmological distances and interact with surrounding material as described by the fireball model. However, prompt optical counterparts have only been seen in one case and are therefore very rare or much dimmer than the sensitivity of the current instruments. Unlike later time afterglows, prompt optical measurements would provide information on the GRB progenitor. LOTIS is the very first automated and dedicated telescope system that actively utilizes the GRB Coordinates Network (GCN) and it attempts to measure simultaneous optical light curve associated with GRBs. After 3 years of running, LOTIS has responded to 75 GRB triggers. The lack of any optical signal in any of the LOTIS images places numerical limits on the surrounding matter density, and other physical parameters in the environment of the GRB progenitor. This paper presents LOTIS results and describes other prompt GRB follow-up experiments including the Super-LOTIS at Kitt Peak in Arizona.
NTIS
Gamma Ray Bursts; Gamma Rays; Light Curve; Actuators

20040050542 NASA Marshall Space Flight Center, Huntsville, AL, USA
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements, I, Analysis Methods and Initial Results
Bonamente, Massimiliano; Joy, Marshall K.; Carlstrom, John E.; LaRoque, Samuel J.; March 2, 2004; 1 pp.; In English
Report No.(s): astro-ph/0403016v2; No Copyright; Avail: Other Sources; Abstract Only

X-ray and Sunyaev-Zeldovich Effect data ca,n be combined to determine the distance to galaxy clusters. High-resolution

X-ray data are now available from the Chandra Observatory, which provides both spatial and spectral information, and interferometric radio measurements of the Sunyam-Zeldovich Effect are available from the BIMA and 0VR.O arrays. We introduce a Monte Carlo Markov chain procedure for the joint analysis of X-ray and Sunyaev-Zeldovich Effect data. The advantages of this method are the high computational efficiency and the ability to measure the full probability distribution of all parameters of interest, such as the spatial and spectral properties of the cluster gas and the cluster distance. We apply this technique to the Chandra X-ray data and the OVRO radio data for the galaxy cluster Abell 611. Comparisons with traditional likelihood-ratio methods reveal the robustness of the method. This method will be used in a follow-up paper to determine the distance of a large sample of galaxy clusters for which high-resolution Chandra X-ray and BIMA/OVRO radio data are available.
Author
Galactic Clusters; Distance; Imaging Techniques; Spectroscopy; Sunyaev-Zeldovich Effect

20040050556 Hawaii Univ., Honolulu, HI, USA
An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses
Simon, Theodore; [2003]; 6 pp.; In English
Contract(s)/Grant(s): NAG5-10128; No Copyright; Avail: CASI; A02, Hardcopy

The objective of these observations was to take advantage of the large collecting area and sensitivity of the European Space Agency's XMM-Newton telescope to obtain X ray grating spectra of two relatively inactive late type stars, Beta Geminorun (K0 III) and the solar analog Beta Hydri (G2 IV). The observations were carried out as scheduled, achieving exposure times of 36 kiloseconds for Beta Gem and 27 kiloseconds for Beta Hyi. Unfortunately both stars were too faint to yield spectra with enough signal-to-noise for any further analysis. Consequently, there are no scientific results to report. The following pages illustrate the very weak X ray spectra that were obtained with the two RGS grating instruments for each star, first Beta Gem and then beta Hyi.
Author
Xmm-Newton Telescope; Coronas; Stars; Solar Energy; Stellar Mass; Late Stars

20040050557 Hawaii Univ., Honolulu, HI, USA
Measuring the Mass Distribution in Z is Approximately 0.2 Cluster Lenses with XMM, HST and CFHT
[2004]; 2 pp.; In English
Contract(s)/Grant(s): NAG5-10041; No Copyright; Avail: CASI; A01, Hardcopy

Being the most massive gravitationally bound objects in the Universe, clusters of galaxies are prime targets for studies of structure formation and evolution. Specifically the comoving space density of virialized clusters of a given mass (or X-ray temperature), but also the frequency and degree of substructure, as well as the shape of the cluster mass profile are quantities whose current values and evolution as a function of lookback time can provide important constraints on the cosmological and physical parameters of structure formation theories. The project funded by NASA grant NAG 5-10041 intended to take such studies to a new level by combining observations of a well-selected cluster sample by three state-of-the-art telescopes: HST, to accurately measure the mass distribution in the cluster core (approx. 0.5 h(sup -1)(sub 50) Mpc) via strong gravitational lensing; CFHT, to measure the large scale mass distribution out to approx. 3 Mpc via weak lensing; and XMM, to measure the gas density and temperature distribution accurately on intermediate scales < 1.5 Mpc. XMM plays a pivotal role in this context as the calibration of X-ray mass measurements through accurate, spatially resolved X-ray temperature measurements (particularly in the cosmologically most sensitive range of kT> 5 keV) is central to the questions outlined above. This set of observations promised to yield the best cluster mass measurements obtained so far for a representative sample, thus allowing us to: 1) Measure the high-mass end of the local cluster mass function; 2) Test predictions of a universal cluster mass profile; 3) calibrate the mass-temperature and temperature-luminosity relations for clusters and the scatter around these relations, which is vital for studies of cluster evolution using the X-ray temperature and X-ray luminosity functions.
Derived from text
Galactic Clusters; Mass Distribution; Gravitational Lenses; X Ray Astronomy

20040050611 Smithsonian Astrophysical Observatory, Cambridge, MA, USA
Exotic Molecules in Space: A Coordinated Astronomical Laboratory and Theoretical Study
Springfellow, Guy, Technical Monitor; Shapiro, Irwin I.; March 2004; 5 pp.; In English
Contract(s)/Grant(s): NAG5-11520; No Copyright; Avail: CASI; A01, Hardcopy

The present report covers the first year of a grant which represents a direct continuation of NASA NAG5-4050, with the

same title as before. It is dedicated as before to the discovery and characterization of new astrophysical molecules. This year, has been extremely productive, yielding many new discoveries of astronomical interest at both radio and optical wavelengths, and the publication or submission of the 15 papers listed below. Nearly all of these articles have or will soon appear in the leading refereed journals of astrophysics, chemical physics, physics, or molecular spectroscopy. One is a major invited review for Molecular Physics. One of our other invited reviews published in Spectrochimica Acta in 2001 was recently awarded the Sir Harold Thompson Memorial Award, annually given to the best paper in that journal. During the past year significant advances have been made by our group in the laboratory study of exotic silicon and carbon molecules of astronomical interest. The most exciting discoveries include the pure silicon cluster Si3, several novel silicon hydrides, and the detection of phenyl radical, C6H5, a fundamental reactive organic ring. In addition, the rotational spectra of many carbon chains terminated with Si, N, O, and other heteroatoms have also been detected for the first time. The laboratory astrophysics of the whole set is complete in the sense that the entire radio spectrum of each species has now been measured or can be calculated to very high accuracy. Nearly all of these newly found molecules are plausible candidates for the detection by radio astronomers in the interstellar gas or in circumstellar sources because they are similar in structure and composition to known astronomical species, and because most are calculated to possess large permanent dipole moments.
Author
Interstellar Chemistry; Interstellar Matter

20040050618 Boston Univ., Boston, MA, USA, Michigan Univ., MI, USA
Frequency-Dependent Time Lags in Three Blazars
Marscher, Alan P.; Jorstad, Svetlana G.; Aller, Margo F.; [2004]; 6 pp.; In English
Contract(s)/Grant(s): NAG5-11811; No Copyright; Avail: CASI; A02, Hardcopy

The work completed includes the analysis of observations obtained during Cycle 6 of the Rossi X-ray Timing Explorer (RXTE). The project is part of a longer-term, continuing program to study the X-ray emission process in blazars in collaboration with Dr. Ian McHardy (U. of Southampton, UK). The goals of the program are to study the X-ray emission mechanism in blazars and the relation of the X-ray emission to changes in the relativistic jet. The program includes contemporaneous brightness and linear polarization monitoring at radio and optical wavelengths, total and polarized intensity imaging at 43 GHz with a resolution of 0.1 milliarcseconds with the VLBA, and well-sampled X-ray light curves obtained from a series of approved RXTE programs. During RXTE cycle 6, the project was awarded RXTE time to monitor three quasars: PKS 1510-089 two times per week, and 3C 273 and 3C 279 three times per week each. The X-ray data, including those from earlier cycles, were compared with radio measurements obtained 2-3 times per week in the centimeter-wave band with the Michigan radio telescope, monthly imaging observations with the VLBA at 43 GHz, and optical observations obtained at several telescopes around the world. Since it is the long-term X-ray light curve that is of greatest value, this report includes discussion of all the data collected through August 2003 rather than just the Cycle 6 data.
Derived from text
X Ray Timing Explorer; Very Long Baseline Array (Vlba); Time Lag; Frequencies; Imaging Techniques; Blazars

20040050636 Charleston Coll., Charleston, SC, USA
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts
Hakkila, Jon; Haglin, David J.; Roiger, Richard J.; Giblin, Timothy; Paciesas, William S.; Pendleton, Geoffrey N.; Mallozzi, Robert S.; 2004; 38 pp.; In English
Contract(s)/Grant(s): NAG5-10625; No Copyright; Avail: CASI; A03, Hardcopy

Despite being the most energetic phenomenon in the known universe, the astrophysics of gamma-ray bursts (GRBs) has still proven difficult to understand. It has only been within the past five years that the GRB distance scale has been firmly established, on the basis of a few dozen bursts with x-ray, optical, and radio afterglows. The afterglows indicate source redshifts of z=1 to z=5, total energy outputs of roughly 10(exp 52) ergs, and energy confined to the far x-ray to near gamma-ray regime of the electromagnetic spectrum. The multi-wavelength afterglow observations have thus far provided more insight on the nature of the GRB mechanism than the GRB observations; far more papers have been written about the few observed gamma-ray burst afterglows in the past few years than about the thousands of detected gamma-ray bursts. One reason the GRB central engine is still so poorly understood is that GRBs have complex, overlapping characteristics that do not appear to be produced by one homogeneous process. At least two subclasses have been found on the basis of duration, spectral hardness, and fluence (time integrated flux); Class 1 bursts are softer, longer, and brighter than Class 2 bursts (with two second durations indicating a rough division). A third GRB subclass, overlapping the other two, has been identified using statistical clustering techniques; Class 3 bursts are intermediate between Class 1 and Class 2 bursts in brightness and duration, but are softer than Class 1 bursts. We are developing a tool to aid scientists in the study of GRB properties. In the process of developing this tool,

we are building a large gamma-ray burst classification database. We are also scientifically analyzing some GRB data as we develop the tool. Tool development thus proceeds in tandem with the dataset for which it is being designed. The tool invokes a modified KDD (Knowledge Discovery in Databases) process, which is described as follows.
Author (revised)
Artificial Intelligence; Gamma Ray Bursts

20040050848 Army Research Inst. of Environmental Medicine, Natick, MA
The Role of Solar and UV Radiation in Environmental Stress Assessment
Moran, Daniel S.; Pandolf, Kent B.; Vitalis, Antonios; Heled, Yuval; Parker, Richard; Nov. 2003; 40 pp.; In English
Report No.(s): AD-A421205; USARIEM-TR-T04-01; No Copyright; Avail: CASI; A03, Hardcopy

The purpose of this study was to evaluate the role of solar and UV radiation components in environmental stress assessment and to test the contribution of the UV radiation variable in a modified environmental stress index (ESI). Meteorological variables, including ambient temperature, wet bulb temperature, black globe temperature, wind velocity, relative humidity, global radiation, and ultraviolet radiation, were measured during the summer (June-September) at three locations in Israel, and during the summer (February-March) at two locations in New Zealand. These five databases were used to calculate the wet bulb globe temperature (WBGT) and the environmental stress index (ESI). Accordingly, analysis of the weight for each parameter from which ESI and WBGT were constructed was evaluated from the three databases collected in Israel, and validated for the two databases collected in New Zealand. In addition, the weight and the contribution of the UV radiation to the thermal load were evaluated in an attempt to include it as a variable in a new modified ESI. These data were collected every 10 minutes over 24 hours and contained over 51,000 measurements for each variable in Israel, and over 18,000 measurements for each variable in New Zealand. Data and statistical analysis revealed that the UV radiation did not contribute to the environmental stress assessment and that the GR component in the ESI was sufficient for heat load assessment. Furthermore, mathematically, the UV radiation was found to be a negative term in the modified ESI. This is probably due to the fact that the UV component was already included in the GR spectrum. In conclusion, the ESI should include the global radiation spectrum (280-2800nm) rather than UV radiation spectrum
DTIC
Environment Effects; Solar Radiation; Stresses; Ultraviolet Radiation

91
LUNAR AND PLANETARY SCIENCE AND EXPLORATION

Includes planetology; selenology; meteorites; comets; and manned and unmanned planetary and lunar flights. For spacecraft design or space stations see *18 Spacecraft Design, Testing and Performance*.

20040045217 NASA Langley Research Center, Hampton, VA, USA
Recovery and Utilization of Extraterrestrial Resources
January 2004; 208 pp.; In English; No Copyright; Avail: CASI; A10, Hardcopy

This special bibliography includes the extraction, processing, and utilization of lunar, planetary, and asteroid resources; mining and excavation equipment, oxygen and propellant production; and in situ resource utilization.
Author
Extraterrestrial Resources; Lunar Mining; Oxygen Production; Materials Recovery; Minerals; Asteroids; Bibliographies

20040045251 NASA Ames Research Center, Moffett Field, CA, USA
System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission
Levri, Julie A.; Perchonok, Michele H.; [2004]; 1 pp.; In English; 34th International Conference on Environmental Systems, 19-22 Jul. 2004, Colorado Springs, CO, USA
Contract(s)/Grant(s): 131-20-10; No Copyright; Avail: Other Sources; Abstract Only

In order to ensure that adequate water resources are available during a mission, any net water loss from the habitat must be balanced with an equivalent amount of required makeup water. Makeup water may come from a variety of sources, including water in shipped tanks, water stored in prepackaged food, product water from fuel cells, and in-situ water resources. This paper specifically addresses the issue of storing required makeup water in prepackaged food versus storing the water in shipped tanks for the Mars Dual Lander Transit Mission, one of the Advanced Life Support Reference Missions. In this paper, water mass balances have been performed for the Dual Lander Transit Mission, to determine the necessary requirement of makeup water under nominal operation (i.e. no consideration of contingency needs), on a daily basis. Contingency issues are

briefly discussed with respect to impacts on makeup water storage (shipped tanks versus storage in prepackaged food). The Dual Lander Transit Mission was selected for study because it has been considered by the Johnson Space Center Exploration Office in enough detail to define a reasonable set of scenario options for nominal system operation and contingencies. This study also illustrates the concept that there are multiple, reasonable life support system scenarios for any one particular mission. Thus, the need for a particular commodity can depend upon many variables in the system. In this study, we examine the need for makeup water as it depends upon the configuration of the rest of the life support system.
Author
Mars Landing Sites; Mars Missions; Food; Moisture Content; Life Support Systems

20040045264 NASA Ames Research Center, Moffett Field, CA, USA
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions
Laub, Bernard; Chen, Yih-Kanq; Skokova, Kristina; Delano, Chad; January 2004; 22 pp.; In English; 55th Pacific Coast Regional and Basic Science Division Fall Meeting, 19-22 Oct. 2003, Oakland, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

The objective of the Mars Sample Return (MSR) Mission is to return a sample of MArtian soil to Earth. The Earth Entry Vehicle (EEV) brings te samples through the atmosphere to the ground.The program aims to: Model aerothermal environment during EEV flight; On the basis of results, select potential TPS materials for EEV forebody; Fabricate TPS materials; Test the materials in the arc jet environment representative of predicted flight environment;Evaluate material performance; Compare results of modeling predictions with test results.
Derived from text
Mars Sample Return Missions; Flight Characteristics; Spacecraft Reentry

20040045269 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA, USA
Space Weathering: An Ultraviolet Indicator
Hendrix, A. R.; Vilas, F.; [2004]; 2 pp.; In English
Contract(s)/Grant(s): NAG9-1209; No Copyright; Avail: CASI; A01, Hardcopy

We present evidence suggesting that the spectral slope of airless bodies in the UV-visible wavelength range can be used as an indicator of exposure to space weathering. While space weathering generally produces a reddening of spectra in the visible-NIR spectral regions, it tends to result in a bluing of the UV-visible portion of the spectrum, and may in some cases produce a spectral reversal. The bluing effect may be detectable with smaller amounts of weathering than are necessary to detect the longer-wavelength weathering effects.
Author
Space Weathering; Ultraviolet Radiation; Light (Visible Radiation); Lunar Exploration

20040045270 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA, USA
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal
Hendrix, Amanda R.; Vilas, Faith; Festou, Michael; Icarus; 2003; ISSN 0019-1035; Volume 162, pp. 1-9; In English
Contract(s)/Grant(s): NAG9-1209; Copyright; Avail: Other Sources

Spectra of asteroid 4 Vesta obtained in October 1990 with the International Ultraviolet Explorer are reanalyzed and reinterpreted. A large portion of the eastern hemisphere (based on the prime meridian definition of Thomas et al., 1997a) is darker at UV Wavelengths than much of the western hemisphere. The UV lightcurve is in contrast with the visible lightcurve, which shows that the eastern hemisphere is brighter than the western. These IUE spectra of Vesta thus may be evidence for the 'spectral reversal.' first seen on the Moon by Apollo 17. where the visibly brighter lunar highlands are darker than the maria at far-UV wavelengths. This effect was linked to space weathering when it was noted (Wagner et al., 1987) that the spectral reversal appears in the laboratory spectra of lunar soils but not powdered lunar rocks. We investigate Vesta's UV lightcurve and spectral reversal, and its possible connection with space weathering. The addition to grain coatings of small amounts of submicroscopic iron (SMFe) through vapor deposition causes drastic spectral changes at UV-visible wavelengths (Hapke, 2001). while the longer wavelength spectrum remains largely unaffected. Other laboratory results (e.g., Hiroi and Pieters, 1998) indicate that the UV-visible wavelength range is affected by simulated weathering processes in a manner similar to what is seen on Vesta. It is likely that Vesta has experienced relatively minor amounts of space weathering, as indicated by the spectral reversal, along with the subtle visible-near infrared weathering effects (e.g., Binzel et al., 1997).
Author
Brightness; Eastern Hemisphere; Light Curve; Ultraviolet Spectra; Vesta Asteroid

20040045296 QSS Group, Inc., Lanham, MD, USA

Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers

Pisanich, Greg; Plice, Laura; Ippolito, Corey; Young, Larry A.; Lau, Benton; Lee, Pascal; [2004]; 16 pp.; In English; International Society for Optical Engineering, 16th International Symposium, San Jose, CA, USA; No Copyright; Avail: CASI; A03, Hardcopy

Numerous researchers have proposed the use of robotic aerial explorers to perform scientific investigation of planetary bodies in our solar system. One of the essential tasks for any aerial explorer is to be able to perform scientifically valuable imaging surveys. The focus of this paper is to discuss the challenges implicit in, and recent observations related to, acquiring mission-representative imaging data from a small fixed-wing UAV, acting as a surrogate planetary aerial explorer. This question of successfully performing aerial explorer surveys is also tied to other topics of technical investigation, including the development of unique bio-inspired technologies.

Author

Outer Planets Explorers; Imaging Techniques; Planets; Robotics; Pilotless Aircraft

20040045310 California Univ., Los Angeles, CA, USA

Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event

Kyte, Frank T.; Gersonde, Rainer; Kuhn, Gerhard; Eos Trans. AGU; 2002; Volume 83, No. 47; 1 pp.; In English; Eos Trans. AGU, 2002

Contract(s)/Grant(s): NAG5-9441

Report No.(s): OS22C-0287; No Copyright; Avail: Other Sources; Abstract Only

The late Pliocene impact of the Eltanin asteroid is the only known asteroid impact in a deep- ocean (-5 km) basin . This was first discovered in 1981 as an Ir anomaly in sediment cores collected by the USNS Eltanin in 1965. In 1995, Polarstern expedition ANT XII/4 made the first geological survey of the suspected impact region. Three sediment cores sampled around the San Martin seamounts (approx. 57.5 S, 91 W) contained well-preserved impact deposits that include disturbed ocean sediments and meteoritic impact ejecta. The latter is composed of shock-melted asteroidal materials and unmelted meteorites. In 2001, the FS Polarstern returned to the impact area during expedition ANT XVIIU5a. At least 16 cores were recovered that contain ejecta deposits. These cores and geophysical data from the expedition can be used to map the effects of the impact over a region of about 80,000 square km. To date we have measured Ir concentrations in sediments from seven of the new cores and preliminary data should be available for a few more by the time of the meeting. Our initial interpretation of these data is that there is a region in the vicinity of the San Martin Seamounts comprising at least 20,000 square km in which the average amount of meteoritic material deposited was more than 1 g per square cm. This alone is enough material to support a 500 m asteroid. Beyond this is a region of about 60,000 square km, mostly to the north and west, where the amount of ejecta probably averages about 0.2 g per square cm. Another 400 km to the east, USNS Eltanin core E10-2 has about 0.05 g per square cm, so we know that ejecta probably occurs across more than a million square km of ocean floor. A key to future exploration of this impact is to find evidence of the ejecta at more sites distant from the seamounts. We currently have almost no data from regions to the west or south of the San Martin seamounts.

Derived from text

Meteoritic Composition; Cores; Sediments; Impact Fusion; Asteroids; Ejecta

20040045312 National Optical Astronomy Observatories, Tucson, AZ, USA, National Solar Observatory, Tucson, AZ, USA, National Solar Observatory, Tucson, AZ, USA, National Solar Observatory, Tucson, AZ, USA

NOAO/NSO Newsletter, No. 77

Isbell, Douglas, Editor; Najita, Joan, Editor; Bell, Dave, Editor; Hartman, Mia, Editor; vanderBliek, Nicole, Editor; Green, Richard, Editor; Hinkle, Ken, Editor; Adams, Sally, Editor, et al.; March 2004; 49 pp.; In English; Copyright; Avail: Other Sources

Contents include the following: Star Formation History at the Galactic Center.Nature of Damped Ly a Absorbers via the Clustering of Lyman Break Galaxies.High-Resolution .Thermal Infrared Imaging of SN 1987A.NOAO at the January AAS Meeting. Adaptive Optics Development Program First Technology Development Awards and Second Roadmap Workshop. A Progress Report from AURA s New Initiatives Office. NOAO Helps Rebuild Mount Stromlo's Library. Postdoc Experience at NOAO South: Rewards and Extra Challenges. NOAO Gemini Science Center. Gemini Observing Opportunities for Semester 2004B. GNIRS Key Science Opportunity. GNIRS Commissioning. Gemini Next-Generation Instrumentation: Progress and Opportunities...The Gemini/IRAF Project. Gemini Science 2004 Meeting. NGSC Instrumentation Program Update. NGSC Booth at the AAS Meeting in Atlanta. Observational Programs. NOAO 2004B Proposals Due 31 March 2004. Community Access Time Available in 2004B with Keck, HET, Magellan, and MMT. Observing Request Statistics for 2004A.

KPNO Instruments Available for 2004B. CTIO Instruments Available for 2004B. Gemini Instruments Possibly Available for 2004B. Keck Instruments Available for 2004B. MMT Instruments Available for 2004B.HET Instruments Available for 2004B. Magellan Instruments Available for 2004B. Cerro Tololo Inter-American Observatory. SOAR Mirror Delivered to Cerro Pachon. SOAR Telescope Time Coming Soon! SOAR-AO Passes Delta CoDR and Receives a Name. New Instruments to See the 'Seeing'. The Hexapod Telescope. Changes in Computing Staffing and Structure at CTIO. Kitt Peak National Observatory. WTTM Completes Commissioning. Proposing for an Upgraded Hydra on WIYN. Multi-Object Spectroscopy with FLAMINGOS. National Solar Observatory/GONG. From the NSO Director s Office. ATST Getting Back to Design. SOLIS. Tip-Tilt Observations of Mercury's Sodium Exosphere. High-Resolution IR Evershed Flow Maps Using AO at the McMath-Pierce Solar Telescope.
CASI
Thermal Mapping; Adaptive Optics; Gemini Project; Mercury Atmosphere; Solar Oscillations; Star Formation

20040045357 NASA Ames Research Center, Moffett Field, CA, USA
Getting the Most from the Twin Mars Rovers
Laufenberg, Larry; November 13, 2003; 2 pp.; In English; No Copyright; Avail: CASI; A01, Hardcopy
The report discusses the Mixed-initiative Activity Planning GENerator (MARGEN) automatically generates activity plans for rovers. Decision support system mixes autonomous planning/scheduling with user modifications. Accommodating change. Technology spotlight
CASI
Decision Support Systems; Mars Surface; Roving Vehicles

20040046891 Colorado Univ., Boulder, CO, USA
Physics of Regolith Impacts in Microgravity Experiment (PRIME)
Motil, Brian, Technical Monitor; Colwell, Joshua; Sture, S.; [2003]; 8 pp.; In English
Contract(s)/Grant(s): NAG3-2400; No Copyright; Avail: CASI; A02, Hardcopy
Collisions between planetary ring particles and in some protoplanetary disk environments occur at low impact velocities (v less than 1 m/s) . In some regions of Saturn s rings, for example, the typical collision velocity inferred from observations by the Voyager spacecraft and dynamical modeling is a fraction of a centimeter per second. Although no direct observations of an individual ring particle exist, the abundance of dust in planetary rings and protoplanetary disks suggests that larger ring and disk particles are coated with a layer of smaller particles and dust - the 'regolith'. Because the ring particles and proto-planetesimals are small (cm to m-sized), the regolith is only weakly bound to the surface by gravity. Similarly, secondary impacts on asteroids by large blocks of ejecta from high velocity cratering events result in low velocity impacts into the asteroid regolith, which is also weakly bound by the asteroid s gravity. At the current epoch and throughout their history, low velocity collisions have played an important role in sculpting planetary systems. In a one-Earth-gravity environment, it is not possible to experimentally determine the behavior of impact eject from such low velocity collisions. Impacts typically occur at speeds exceeding the mutual escape velocity of the two bodies. Thus, impacts at speeds on the order of 10 m/sec or less involve objects that are tens of meters across, or smaller. This research program is an experimental study of such low velocity collisions in a microgravity environment. The experimental work builds on the Collisions Into Dust Experiment (COLLIDE), which has flown twice on the space shuttle. The PRIME experimental apparatus is a new apparatus designed specifically for the environment provided on the NASA KC- 135 reduced gravity aircraft.
Author
Regolith; Asteroids; Collisions; Dust; Escape Velocity; Gravitational Effects; Impact Velocity; Microgravity

20040046902 Toledo Univ., OH, USA
[Analysis of Observations from Mars Global Surveyor]
James, Philip B.; [2004]; 4 pp.; In English
Contract(s)/Grant(s): NAG5-8183; No Copyright; Avail: CASI; A01, Hardcopy
This grant supported various data analysis projects involving calibration and analysis of observations of the Martian polar caps and of condensate and dust clouds by Mars Global Surveyor.
Author
Data Management; Calibrating; Mars Surface; Dust; Condensates

20040046910

Geophysics of Martian Periglacial Processes

Mellon, Michael T.; January 29, 2004; 6 pp.; In English

Contract(s)/Grant(s): NAG5-13172; No Copyright; Avail: CASI; A02, Hardcopy

Through the examination of small-scale geologic features potentially related to water and ice in the martian subsurface (specifically small-scale polygonal ground and young gully-like features), determine the state, distribution and recent history of subsurface water and ice on Mars. To refine existing models and develop new models of near-surface water and ice, and develop new insights about the nature of water on Mars as manifested by these geologic features. Through an improved understanding of potentially water-related geologic features, utilize these features in addressing questions about where to best search for present day water and what space craft may encounter that might facilitate or inhibit the search for water.

Author

Ice; Mars Surface; Water

20040046912 Smithsonian Astrophysical Observatory, Cambridge, MA, USA

Astrometric and Photometric Follow-Up of Faint Near Earth Objects

Spahr, Timothy; March 2004; 2 pp.; In English

Contract(s)/Grant(s): NAG5-13304; No Copyright; Avail: CASI; A01, Hardcopy

During the last year, the Near-Earth Object (NEO) follow-up program at Mt. Hopkins funded by the Near-Earth Object Observations (NEOO) program continued to improve. The Principal Investigator was again granted all the requested observing time. In addition to the requested time on the 4 8 in. telescope, 2 nights were also granted on the MMT for observations of extremely faint main-belt asteroids and NEOs. It is expected that the MMT can easily reach V = 25 over a 24 X 24 arcminute field of view. Improvements in the last year included more tweaks to the automatic astrometric routine for higher-quality astrometric fits. Use of the new USNO-B1.0 reference catalog has allowed the PI to push the average RMS of reference star solutions below 0.2 in.. Shift-and- stack techniques are used to improve the signal-to-noise ratio of the target objects. The 48 in. telescope at Mt. Hopkins is completely automated, and can be run remotely from either the Principal Investigator's office at SAO, or even his study at home. Most observing runs are now done remotely.

Author

Astrometry; Photometry; Targets; Near Earth Objects; Faint Objects

20040046935 Uppsala Univ., Uppsala, Sweden

Properties of the Hermean Regolith, 5, New Optical Reflectance Spectra, Comparison with Lunar Anorthosites and Mineralogical Modelling

Warell, J.; Blewett, D. T.; ICARUS; [2003]; ISSN 0019-1035; 1 pp.; In English

Contract(s)/Grant(s): NASW-02007; No Copyright; Avail: Other Sources; Abstract Only

We present new optical (0.4-0.65 micron) spectra of Mercury and lunar pure anorthosite locations, obtained quasi-simultaneously with the Nordic Optical Telescope (NOT) in 2002. A comparative study is performed with the model of Lucey et al. between iron-poor, mature, pure anorthosite (less than 90% plagioclase feldspar) Clementine spectra from the lunar farside and a combined 0.4-1.0 micron mercurian spectrum, obtained with the NOT, calculated for standard photometric geometry. Mercury is located at more extreme locations in the Lucey ratio-reflectance diagrams than any known lunar soil, specifically with respect to the extremely iron-poor mature anorthosites. Though quantitative prediction of FeO and TiO2 abundances cannot be made without a more generally applicable model, we find qualitatively that the abundances of both these oxides must be near zero for Mercury. We utilize the theory of Hapke, with realistic photometric parameters, to model laboratory spectra of matured mineral powders and lunar soils, and remotely sensed spectra of lunar anorthosites and Mercury. An important difference between fabricated and natural powders is the high value for the internal scattering parameter necessary to interpret the spectra for the former, and the requirement of rough and non-isotropically scattering surfaces in the modelling of the latter. The mature lunar anorthosite spectra were well modelled with binary mixtures of calcic feldspars and olivines, grain sizes of 25-30 micron and a concentration of submicroscopic metallic iron (SMFe) of 0.12-0.15% in grain coatings. The mercurian spectrum is not possible to interpret from terrestrial mineral powder spectra without introducing an average particle scattering function for the bulk soil that increases in backscattering efficiency with wavelength. The observed spectrum is somewhat better predicted with binary mixture models of feldspars and pyroxenes, that single-component regoliths consisting of either albite or diopside. Correct spectral reflectance values were predicted with a concentration of 0.1 wt% SMFe in coatings of 15-30 micron sized grains. Since reasonable cosmogonical formation scenarios for Mercury, or meteoritic infall, predict iron concentrations at least this high, we draw the conclusion that the average grain size of Mercury is about a factor of two smaller than for average returned lunar soil samples. The 0.6-2.5 micron spectrum of McCord and

Clark is used to further limit the possible range of mineralogical composition of Mercury. It is found that an intimately mixed and matured 3 : 1 labradorite-to-enstatite regolith composition best matches both the optical and near-infrared spectra, yielding an abundance of approx. 1.2 wt% FeO and -approx. 0 wt% TiO2.
Author
Lunar Soil; Mineralogy; Minerals; Remote Sensing; Regolith; Titanium Oxides; Iron Oxides; Spectral Reflectance

20040046942 Massachusetts Inst. of Tech., Cambridge, MA, USA
A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants
Allen, Glenn E.; March 30, 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG5-9237; No Copyright; Avail: CASI; A01, Hardcopy

The term of the forth year of the award is the period from March 15, 2003 to March 14, 2004. During this year, Dr. Thomas Pannuti, who had been performing most of the analyses, made a transition to a new position at Caltech. As of September 2003, Dr. Michael Stage began performing most of the analyses. Dr. Stage has begun constructing a detailed catalog of the spatial and spectral properties of young supernova remnants as described in sections 1 and 4 of the proposal. Specifically, he has focused on the analysis of Chandra ACIS data. The exquisite spatial resolution of the Chandra telescope and the modest spectral resolution of the CCDs make these data ideal. Dr. Stage has developed a standard set of procedures to reduce the data, generate telescope and detector response libraries and handle instrumental and celestial background subtraction. He has also adapted some existing code to automate spectral extraction and fitting. This code enables us to analyze the spectra of tens of thousands of small subregions of supernova remnants. Dr. Stage has recently applied this process to ACIS data for the supernova remnants Cas A and Kepler. The results include maps of the fitted parameters, such as individual line intensities and centroids (i.e. Doppler shifts), the electron temperature, and the absorption column density. These maps are more accurate than simple energy-cut images because it is difficult (and sometimes impossible) to cleanly separate the line emission from the underlying continuum (especially at low energies). It is now possible to identify the locations at which emission from each element is produced. Some of the elements are seen to be layered. The electron temperature maps demonstrate that the outer edges of Cas A and Kepler are very hot with weak lines. This emission is almost certainly synchrotron dominated. Therefore, not only are the maps interesting in and of themselves, but they also provide an unbiased means of easily identifying features in the remnants that can be studied in more detail using, for example, synchrotron models. Over the next year, Dr. Stage will refine the analysis procedures, expand the analyses to include several other remnants, present the results at major scientific conferences and publish a catalog of the results. Since this work is producing impressive results, we have applied for very long Chandra observations of Kepler and Tycho to obtain enough counts to take lull advantage of the technique. A i Ms observation of Cas A is already scheduled. Over the past year, I completed a joint, spectra,l analysis of some X-ray, radio, and gamma-ray data for the supernova remnant SN 1006. The results of this analysis show that the synchrotron and, hence, electron spectrum of the remnant is curved. The amount of curvature in the electron spectrum is quantitatively consistent with predictions of the amount of curvature in the proton spectrum of the remnant. A paper describing this work is nearly complete. When Dr. Pannuti left, he was analyzing X-ray data for the young supernova remnant G266.2-1.2. Dr. Pannuti found the first evidence of thermal X-ray emission from this remnant. Furthermore, like SN 1006, the cutoff frequency varies with azimuth along the bright northeastern rim. This work will be published during the coming year.
Author
X Rays; Tycho Crater; Thermal Emission; Catalogs (Publications); Supernova Remnants

20040046944 NASA Goddard Space Flight Center, Greenbelt, MD, USA
A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions
Lowman, Paul D., Jr.; October 15, 2003; 12 pp.; In English; International Lunar Conference 2003: International Lunar Exploration Working Group 5, 16-22 Nov. 2003, Waikoloa, HI, USA; No Copyright; Avail: CASI; A03, Hardcopy

This paper outlines a possible mission to emplace a robotic infrared / submillimeter wave interferometer array near the lunar south pole. This region has now been investigated by the Clementine and Lunar Prospector missions, and by Earth-based radar, and its topography and thermal environment are fairly well-known. The area would be exceptionally suitable for infrared / submillimeter astronomy because of the continually low temperatures, approaching that of liquid nitrogen (77K) in some places. A submillimeter spaceborne interferometer mission, Submillimeter Probe of the Evolution of the Cosmic Structure (SPECS) has been proposed by John Mather and others, covering the 40 - 500 micron region with 3 formation flying telescopes. The present paper proposes a lunar adaptation of the SPECS concept, LSPECS. This adaptation would involve landing 4 telescopes on the area north of Shackleton crater at zero degrees longitude. This is in nearly year round darkness but is continually radar visible from Earth. The landed payload of LSPECS would include a telerobotic rover, 4 three meter submm telescopes, a solar power array to be emplaced on the continually sunlit north rim of Shackleton crater, and an S-band

antenna for data relay to Earth. Passive cooling without the use of expendable cryogenics. might be possible, trading long exposure time for instrument temperatures above that of liquid helium. The LSPECS would permit long-term study of an extremely wide range of cosmic and solar system phenomena in the southern celestial hemisphere. For complete sky coverage, a similar installation near the north pole would be required. The LSPECS site would also be suitable other types of observation, such as optical interferometry or centimeter wavelength radio astronomy. The lunar south pole is also of great interest because of its extensive ice deposits, which may represent cometary infall with pre-biotic compounds.
Author
Astronomy; Space Missions; Lunar Prospector; Polar Regions; Telerobotics; Southern Hemisphere

20040047050 Space Telescope Science Inst., Baltimore, MD, USA
The Composition and Physical Structure of the Io Torus and Atmosphere
McGrath, Melissa; April 06, 2004; 2 pp.; In English
Contract(s)/Grant(s): NAG5-6882; SRScI Proj. J0110; No Copyright; Avail: CASI; A01, Hardcopy

Generally speaking the goal of the research was to provide detailed spectral analysis of a Hopkins Ultraviolet Telescope EUV/FUV spectrum of the Io plasma torus. The specific research tasks outlined to achieve this goal were: Line identifications and brightnesses. Verify line identifications with independent data sets. Simple physical modeling to derive ne, ni, Te. Determine neutral source rates. Determine implications of minor species abundances for Io processes. Determine spatial structure from HUT data.
Author
Composition (Property); Io; Spectrum Analysis; Toroidal Plasmas; Toruses

20040050622 NASA, Washington, DC, USA
Apollo 13 - Press Kit
April 02, 1970; 141 pp.; In English; Original contains black and white illustrations
Report No.(s): NASA-News-Release-70-50K; No Copyright; Avail: CASI; A07, Hardcopy

Apollo 13, the third U.S. manned lunar landing mission, will be launched April 11 from Kennedy Space Center, Fla., to explore a hilly upland region of the Moon and bring back rocks perhaps five billion years old. The Apollo 13 lunar module will stay on the Moon more than 33 hours and the landing crew will leave the spacecraft twice to emplace scientific experiments on the lunar surface and to continue geological investigations. The Apollo 13 landing site is in the Fra Mauro uplands; the two National Aeronautics and Space Administration previous landings were in mare or 'sea' areas, Apollo 11 in the Sea of Tranquility and Apollo 12 in the Ocean of Storms.
Derived from text
Apollo 13 Flight; Apollo Spacecraft; Lunar Exploration; Lunar Trajectories

20040050934 NASA, Washington, DC, USA
Apollo 14 - Press Kit
January 21, 1971; 113 pp.; In English; Original contains black and white illustrations
Report No.(s): NASA-News-Release-71-3K; No Copyright; Avail: CASI; A06, Hardcopy

Apollo 14, the sixth USA manned flight to the Moon and fourth Apollo mission with an objective of landing men on the Moon, is scheduled for launch Jan. 31 at 3:23 p.m. EST from Kennedy Space Center, Fla. The Apollo 14 lunar module is to land in the hilly upland region north of the Fra Mauro crater for a stay of about 33 hours, during which the landing crew will leave the spacecraft twice to set up scientific experiments on the lunar surface and to continue geological explorations. The two earlier Apollo lunar landings were Apollo 11 at Tranquility Base and Apollo 12 at Surveyor 3 crater in the Ocean of Storms.
Author (revised)
Apollo 14 Flight; News Media; Lunar Exploration

92
SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots. For related information see *93 Space Radiation*.

20040046905 Catholic Univ. of America, Washington, DC, USA
Interpretive Tools for Analysis of Coronal Images
Ofman, Leon; [2004]; 2 pp.; In English
Contract(s)/Grant(s): NAG5-4940; No Copyright; Avail: CASI; A01, Hardcopy

Contents include list of publications resulting from grant: Magneto-Hydrodynamic Model of the Solar Corona and Interplanetary Medium. Coronal magnetic field topology and source of fast solar wind. Geophysical Importance of Global Magnetic Field Geometry and Density Distribution in Solar Wind Modeling. Empirical Model of the Corona-Solar Wind with Multiple Current Sheets. Model of the Solar Wind and its Comparison with ULYSSES. Physical properties of a coronal hole from a coronal diagnostic spectrometer, Mauna Loa Coronagraph, and LASCO observations during the Whole Sun Month. Semi-Empirical 2-D MHD Model of the Solar corona and Solar Wind: Energy Flow in the Corona. Source Region of High and Low Speed Wind during the Spartan. Three-dimensional coronal density structure. Cone Model for Halo CME's: Application to Space Weather Forecasting.
CASI
Astronomical Models; Density Distribution; Interplanetary Medium; Magnetic Field Configurations; Solar Corona; Solar Energy; Two Dimensional Models; Weather Forecasting

20040046931 NASA, Washington, DC, USA
Three-Dimensional Coronal Density Structure: 1. Model
Gibson, S. E.; Foster, D. J.; Guhathakurta, M.; Holzer, T.; St.Cyr, O. C.; Journal of Geophysical Research; 2003; ISSN 0148-0227; Volume 108, No. A121444, pp. 7-1 - 7-12; In English
Contract(s)/Grant(s): HAO02242; NAG5-4940; NAG5-8018; NASA Order S-13797-G; NSF ATM-01-20950; Copyright; Avail: Other Sources

The three-dimensional (3-D) density structure of the solar corona is a fundamental boundary condition on the solar wind. Most easily applied models of the global coronal density have been restricted to date to axisymmetric 2-D cases. We present here a 3-D model made up of a superposition of multiple streamers, having distinct gaussian widths in longitude and latitude and both longitudinal and latitudinal dependence of the neutral lines implicit beneath the streamer cores. Nonradiality of streamers and solar B-angle tilt are also explicitly treated. We show how this simple model can capture many of the general properties of coronal white light observations and demonstrate how such a model can assist in the interpretation of the multiple views on coronal structures such as will be provided by the upcoming STEREO mission.
Author
Three Dimensional Models; Density (Mass/Volume); Solar Corona; Boundary Conditions

20040047155 Massachusetts Inst. of Tech., Cambridge, MA, USA
A Search for the Solar Sources of High-Speed Streams
[2004]; 7 pp.; In English
Contract(s)/Grant(s): NAG5-7967; No Copyright; Avail: CASI; A02, Hardcopy

The original Grant was intended to support backward mapping of the stream structures observed at 1 AU by the WIND spacecraft using the observed wind speeds so that solar sources of the streams could be explored. Realizing that backwards mapping was unlikely to produce reasonable results inside of about 30 Rs, we let a subcontract to Mikic and Linker at SAIC who had developed a MHD code to cover the distance between the lower corona and 30 Rs. We used IPS measurements made by our Co-I Andy Breen to try to establish a correlation between the mapped-back streams and IPS determinations of the stream sources. We report the results of these portions of the program and then explain the progress on studies which were proposed to give insight into stream sources by exploiting the alpha/proton abundance ratios observed from WIND.
Derived from text
Magnetohydrodynamics; Coronas; Computer Programs; Mapping; Streams

20040047157 NASA Goddard Space Flight Center, Greenbelt, MD, USA
Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month
Guhathakurta, M.; Fludra, A.; Gibson, S. E.; Biesecker, D.; Fisher, R.; Journal of Geophysical Research; January 2004; ISSN 0148-0227; Volume 104, No. A5, pp. 9801-9808; In English
Contract(s)/Grant(s): NAG5-4940; NAG5-6250
Report No.(s): Paper-1998JA900082; Copyright; Avail: Other Sources

Until recently, inference of electron density distribution in the solar corona was limited by the field of view of white-light coronagraphs (typically out to 6 Rs). Now, for the first time we have a series of white- light coronagraphs (SOHO/LASCO) whose combined field of view extends from 1.1 - 30 Rs. Quantitative information on electron density distribution of coronal hole and coronal plumes/rays are estimated by using white-light, polarized brightness (pB) observations from the

SOHO/LASCO/C2 and C3 and HAO/Mauna Loa Mark III coronagraphs from 1.15 to 8.0 Rs. Morphological information on the boundary of the polar coronal hole and streamer interface is determined from the white-light observations in a manner similar to the Skylab polar coronal hole boundary estimate. The average coronal hole electron density in the region 1 - 1.15 Rs is estimated from the density-sensitive EUV line ratios of Si IX 3501342 A observed by the SOHO/coronal diagnostic spectrometer (CDS). We combine these numbers with the estimate from white-light (WL) observations to obtain a density profile from 1 to 8 Rs for the plumes and the polar coronal hole. We find that white light and spectral analysis produce consistent density information. Extrapolated densities inferred from SOHO observations are compared to Ulysses in situ observations of density. Like the density inferred from the Spartan 201-03 coronagraph, the current SOHO density profiles suggest that the acceleration of the fast solar wind takes place very close to the Sun, within 10-15 Rs. The density information is used to put constraints on solar wind flow velocities and effective temperatures. Finally, these results are compared to the recent analysis of the Spartan 201-03 white-light observations.
Author
Electromagnetic Properties; Coronal Holes; Spectrometers; Solar Corona; Electron Density (Concentration); Density Distribution

20040047163 NASA Goddard Space Flight Center, Greenbelt, MD, USA
Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium
Sittler, Edward C., Jr.; Guhathakurta, Madhulika; Astronomical Journal; January 10, 2004; Volume 523, pp. 812-826; In English
Contract(s)/Grant(s): NAG5-4940; Copyright; Avail: Other Sources
We have developed a two-dimensional semiempirical MHD model of the solar corona and solar wind. The model uses empirically derived electron density profiles from white-light coronagraph data measured during the Skylub period and an empirically derived model of the magnetic field which is fitted to observed streamer topologies, which also come from the white-light coronagraph data The electron density model comes from that developed by Guhathakurta and coworkers. The electron density model is extended into interplanetary space by using electron densities derived from the Ulysses plasma instrument. The model also requires an estimate of the solar wind velocity as a function of heliographic latitude and radial component of the magnetic field at 1 AU, both of which can be provided by the Ulysses spacecraft. The model makes estimates as a function of radial distance and latitude of various fluid parameters of the plasma such as flow velocity V, effective temperature T(sub eff), and effective heat flux q(sub eff), which are derived from the equations of conservation of mass, momentum, and energy, respectively. The term effective indicates that wave contributions could be present. The model naturally provides the spiral pattern of the magnetic field far from the Sun and an estimate of the large-scale surface magnetic field at the Sun, which we estimate to be approx. 12 - 15 G. The magnetic field model shows that the large-scale surface magnetic field is dominated by an octupole term. The model is a steady state calculation which makes the assumption of azimuthal symmetry and solves the various conservation equations in the rotating frame of the Sun. The conservation equations are integrated along the magnetic field direction in the rotating frame of the Sun, thus providing a nearly self-consistent calculation of the fluid parameters. The model makes a minimum number of assumptions about the physics of the solar corona and solar wind and should provide a very accurate empirical description of the solar corona and solar wind Once estimates of mass density rho, flow velocity V, effective temperature T(sub eff), effective heat flux q(sub eff), and magnetic field B are computed from the model and waves are assumed unimportant, all other plasma parameters such as Mach number, Alfven speed, gyrofrequency, etc. can be derived as a function of radial distance and latitude from the Sun. The model can be used as a planning tool for such missions as Slar Probe and provide an empirical framework for theoretical models of the solar corona and solar wind The model will be used to construct a semiempirical MHD description of the steady state solar corona and solar wind using the SOHO Large Angle Spectrometric Coronagraph (LASCO) polarized brightness white-light coronagraph data, SOHO Extreme Ultraviolet Imaging Telescope data, and Ulysses plasma data.
Author
Numerical Analysis; Two Dimensional Models; Magnetohydrodynamics; Solar Corona; Interplanetary Medium

20040047164 NASA Goddard Space Flight Center, Greenbelt, MD, USA
Coronal Magnetic Field Topology and Source of Fast Solar Wind
Guhathakurta, M.; Sittler, E.; Fisher, R.; McComas, D.; Thompson, B.; Geophysical Research Letters; October 1, 1999; ISSn 0094-8276; Volume 26, No. 19, pp. 2901-2904; In English
Contract(s)/Grant(s): NAG5-4940
Report No.(s): Paper-1999GL010662; Copyright; Avail: Other Sources
We have developed a steady state, 2D semi-empirical MHD model of the solar corona and the solar wind with many

surprising results. This model for the first time shows, that the boundary between the fast and the slow solar wind as observed by Ulysses beyond 1 AU, is established in the low corona. The fastest wind observed by Ulysses (680-780 km/s) originates from the polar coronal holes at 70 -90 deg. latitude at the Sun. Rapidly diverging magnetic field geometry accounts for the fast wind reaching down to a latitude of +/- 30 deg. at the orbit of Earth. The gradual increase in the fast wind observed by Ulysses, with latitude, can be explained by an increasing field strength towards the poles, which causes Alfven wave energy flux to increase towards the poles. Empirically, there is a direct relationship between this gradual increase in wind speed and the expansion factor, f, computed at r greater than 20%. This relationship is inverse if f is computed very close to the Sun. Author

Magnetic Field Configurations; Magnetohydrodynamics; Two Dimensional Models; Solar Corona; Solar Wind; Astronomical Models

20040047256 NASA Marshall Space Flight Center, Huntsville, AL, USA

A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections

Falconer, D. A.; Moore, R. L.; Journal of Geophysical Research; 2003; 0148-0227; Volume 108, No. A10; 7 pp.; In English; Copyright; Avail: Other Sources

From a sample of 17 vector magnetograms of 12 bipolar active regions we have recently found (1) that a measure of the overall nonpotentiality (the overall twist and shear in the magnetic field) of an active region is given by the strong shear length Lss, the length of the portion of the main neutral line on which the observed transverse fields is strong (greater than 150 Guass (G)) and strongly sheared (shear angle greater than 45 degrees), and (2) that L(sub ss) is well correlated with the coronal mass ejection (CME) productivity of the active regions during the plus or minus 2-day time window centered on the day of the magnetogram. In the present paper, from the same sample of 17 vector magnetograms, we show that there is a viable proxy for L(sub ss) that can be measured from a line-of-sight magnetogram. This proxy is the strong gradient length L(sub SG), the length of the portion of the main neutral line on which the potential transverse field is strong (greater than 150 G), and the gradient of the line-of-sight field is sufficiently steep (greater than approximately 50 G/Mm). In our sample of active regions, L(sub SG) is statistically significantly correlated with Lss (correlation confidence level greater than 95%), and L(sub SG) is as strongly correlated with active region CME productivity as is L(sub SS) (correlation confidence level approximately 99.7%). Because L(sub SG) can be measured from line-of-sight magnetograms obtained from conventional magnetographs, such as the magnetograph mode of the Michelson Doppler Imager (MDI) on board the Solar and Heliospheric Observatory, it is a dependable substitute for L(sub SS) for use in operational CME forecasting. In addition, via measurement of L(sub SG), the years-long, nearly continuous sequence of 1.5-hour cadence full disk line-of-sight magnetograms from MDI can be used to track the growth and decay of the large-scale nonpotentiality in active regions and to examine the role of this evolution in active region CME productivity.

Author

Coronal Mass Ejection; Line of Sight; Magnetic Signatures; Space Weather; Solar Physics

20040047278 Communications Research Lab., Japan

Review of the Communications Research Laboratory, Volume 48, No. 4

December 2002; ISSN 0914-9279; 164 pp.; In Japanese; Copyright; Avail: Other Sources

Contents include the following: Research on a System for Monitoring, Analyzing, and Forecasting of the Space Environment. Ionosphere and Thermosphere. Solar and solar wind. Mission and observation of interplanetary Coronal Mass Ejection (CME).Solar wind plasma instrument for the L5 mission. Forecast tool using Java Script for predicting arrival time of interplanetary disturbances to the Earth. Real time data reception of ACE and IMAGE satellites. Prediction of the Dst index from solar wind parameters by a neural network method. Real time geomagnetic data acquisition from Siberia region and its application. Quasi-real time geomagnetic data transfer from near northern magnetic pole region. Development of instruments for imaging of the resonance scattering emission from oxygen ion (O II:83.4nm). Ionosphere and thermosphere. Ionospheric observation and observation information processing system. Space environment information service system.Development of telephone service system. Space weather forecast in the future manned space era. Correcting instable signal in near-field antenna gain measurement.

CASI

Advanced Composition Explorer; Data Acquisition; Imaging Techniques; Solar Wind; Telephones; Weather Forecasting

20040047283 Alabama Univ., Huntsville, AL, USA

Forecasting Coronal Mass Ejections from Magnetograms

Falconer, D. A.; Balasubramanian, S.; Moore, R. L.; Gary, G. A.; January 2004; 1 pp.; In English; Living With a Star Workshop, 23-26 Mar. 2004, Boulder, CO, USA; No Copyright; Avail: Other Sources; Abstract Only

We report further results from our ongoing assessment of magnetogram-based measures of active-region nonpotentiality (magnetic shear and twist) and size as predictors of coronal mass ejections (CMEs). From a set of 36 vector magnetograms of bipolar active regions (Falconer, Moore, & Gary 2004, ApJ, submitted), we have found that (1) each of our 5 measures of active-region nonpotentiality has a 75-80% success rate in predicting whether an active region will produce a CME within 2 days after the magnetogram, (2) the correlation of each of these measures with CME production in this window is statistically significant (confidence level greater than 95%), (3) our measure of active-region size has a 65% success rate in predicting CMEs in this window, but (4) the correlation between active-region size and CME productivity is not statistically significant (confidence level approximately 80%). As part of the work under our pending 2003 LWS TR&T proposal, we will double our sample to approximately 70 active regions in order to demonstrate a statistically significant correlation between active-region size and CME productivity, and to determine whether this correlation is a byproduct of any Sun-produced correlation between magnetic twist and size of active regions. Since the 2002 LWS Science Workshop, we have found a measure of active-region nonpotentiality (the length of strong-gradient neutral line) that can be measured from a line-of-sight magnetogram, and we have generalized this measure and the corresponding measure from a vector magnetogram (the length of strong-shear neutral line) so that they can be applied to multiple-bipole complex active regions as well as to bipolar active regions. Preliminary results will be presented from application of these two generalized measures to our sample of bipolar active regions and to a new sample of multiple-bipole active regions.
Author
Coronal Mass Ejection; Magnetic Signatures; Polar Regions

20040050559 Science Applications International Corp., San Diego, CA, USA, Massachusetts Inst. of Tech., MA, USA
A Search for Solar Sources of High-Speed Solar Wind Streams
Mikic, Zoran; December 16, 2002; 3 pp.; In English
Contract(s)/Grant(s): NAG5-7967; No Copyright; Avail: CASI; A01, Hardcopy

This report covers technical progress during the third and fourth years of Subcontract No. 5710000474, 'A Search for Solar Sources of High-speed Solar Wind Streams,' between Science Applications International Corporation (SAIC) and the Massachusetts Institute of Technology (MIT), covering the period November 2000 to December 2002. This is a subcontract originating from NASA SR&T Contract NAG5-7967 with MIT. In the following sections we summarize our progress during this reporting period.
Author
Solar Wind; Streams

20040050568 Science Applications International Corp., San Diego, CA, USA
Understanding the Solar Sources of In Situ Observations
Riley, Pete; Mikic, Zoran; Linker, Jon; Zurbuchen, Thomas H.; June 21, 2002; 5 pp.; In English; Proceedings of the Solar Wind 10 Meeting, 16-21 Jun. 2002, Pisa, Italy; Original contains black and white illustrations
Contract(s)/Grant(s): NAG5-7967
Report No.(s): SAIC-02/8019:APPAT-308; Copyright; Avail: CASI; A01, Hardcopy

The solar wind can, to a good approximation be described as a two component flow with fast, tenuous, quiescent flow emanating from coronal holes, and slow, dense and variable flow associated with the boundary between open and closed magnetic fields. In spite of its simplicity, this picture naturally produces a range of complex heliospheric phenomena, including the presence, location, and orientation of corotating interaction regions and their associated shocks. In this study, we apply a two-step mapping technique, incorporating a magnetohydrodynamic model of the solar corona, to bring in situ observations h m Ulysses, WIND, and ACE back to the solar surface in an effort to determine some intrinsic properties of the quasi-steady solar wind. In particular, we find that a 'layer' of approx. 35,000 h n exists between the Coronal Hole Boundary (CHB) and the fast solar wind, where the wind is slow and variable. We also- derive a velocity gradient within large polar coronal boles (that were present during Ulysses rapid latitude scan) as a function of distance from the CHB. We find that nu = 713 km/s + 3.2 d, where d is the angular distance from the CHB boundary in degrees.
Author
Solar Corona; Solar Wind; In Situ Measurement; Magnetic Fields; Coronal Holes

99
GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs such as Apollo, Gemini, and Mercury spacecraft, Earth Resources Technology Satellite (ERTS), and Skylab; NASA appropriations hearings.

20040045366 Azimuth Education Foundation, San Clemente, CA, USA
Centennial of Flight Educational Outreach
McCarthy, Marianne, Technical Monitor; Miller, Susan, Technical Monitor; Vanderpool, Celia; [2003]; 5 pp.; In English
Contract(s)/Grant(s): NAG4-223; No Copyright; Avail: CASI; A01, Hardcopy

The Centennial of Flight Education Outreach project worked with community partners to disseminate NASA Education materials and the Centennial of Flight CD-ROM as a vehicle to increase national awareness of NASA's Aerospace Education products, services and programs. The Azimuth Education Foundation and the Ninety Nines, an International Women Pilots Association, Inc. were chartered to conduct education outreach to the formal and informal educational community. The Dryden Education Office supported the development of a training and information distribution program that established a national group of prepared Centennial of Flight Ambassadors, with a mission of community education outreach. These Ambassadors are members of the Ninety Nines and through the Azimuth Foundation, they assisted the AECC on the national level to promote and disseminate Centennial of Flight and other educational products. Our objectives were to explore partnership outreach growth opportunities with consortium efforts between organizations. This project directly responded to the highlights of NASA s Implementation Plan for Education. It was structured to network, involve the community, and provide a solid link to active educators and current students with NASA education information. Licensed female pilots who live and work in local communities across the nation carried the link. This partnership has been extremely gratifying to all of those Ninety-Nines involved, and they eagerly look forward to further work opportunities.
Author
Education; NASA Programs

20040047012 Du Pont de Nemours (E. I.) and Co., Aiken, SC, USA
Performance Evaluation of O-Rings in the SAFKEG 3940A Package in KAMS (U)
Skidmore, T. E.; May 2003; 30 pp.; In English
Report No.(s): DE2004-820089; WSRC-TR-2003-00198; No Copyright; Avail: Department of Energy Information Bridge

The purpose of this report is to document the technical basis for acceptance of the EPDM O-ring seals in the SAFKEG 3940A package proposed for storage of Pu-bearing material in the KAMS facility.
NTIS
O Ring Seals; Evaluation; Performance Tests

20040047013 Du Pont de Nemours (E. I.) and Co., Aiken, SC, USA
Pressurization Analysis of Containers in the SAFKEG 3940A Package in KAMS (U)
Malene, S. H.; Rawls, G. B.; 2003; 16 pp.; In English
Report No.(s): DE2004-820090; WSRC-TR-2003-00199; No Copyright; Avail: Department of Energy Information Bridge

This report evaluates the pressure capacity of the SAFKEG 3940A shipping package for storage in the K- Area Materials Storage Facility. Bounding internal pressures are determined and compared to calculated maximum allowable pressures.
NTIS
Boundaries; Internal Pressure

20040047067 Argonne National Lab., IL
Radiological Considerations for Top-Up Operation of the Storage Ring
Moe, H. J.; Feb. 1998; 12 pp.; In English
Report No.(s): DE2003-816764; No Copyright; Avail: Department of Energy Information Bridge

Radiological considerations for the operation of the storage ring prior to top-up operation have been discussed in another document. This document was prepared to serve as the technical basis for the hazard analysis considerations and the statements in the APS Safety Assessment Document (SAD) dealing with shielding adequacy and other radiological considerations. The methodology used in that document and, subsequently, in the analysis of hazards from the low-energy undulator test line was also used for shielding analysis and dose determinations in this document. Two additional issues relevant to top-up operation, which give rise to potential radiological considerations, are 1) the possible use of the vertical scraper in the booster-to-storage

ring (BTS) line to control the amount of charge that is being delivered to the storage ring, and 2) the potential accident situations, which give rise to radiation doses to individuals on the experiment hall floor and SR roof. By introducing the scraper, a portion of the beam produces a shower in the tungsten scraper, which leads to radiation fields on the top of the SR tunnel and in the Early Assembly Area (EAA). This requires additional shielding of the scraper. Potential doses to individuals on the floor of the experiment hall can result from a loss of particles down a photon beamline. Tracking results have shown that particles that find their way down a photon beamline will eventually be lost either in a Pb collimator or in the safety shutters in the front end of a bending magnet (BM), or on the safety shutters in an insertion device (ID) beamline. Either of these situations will result in a significant dose rate on the experiment hall floor if the event takes place during injection for top-up. Analyses of these and other accident scenarios are treated in this report. Minor doses will result from loss of a single stored beam in either of the above scenarios.
NTIS
Radiology; Storage Rings (Particle Accelerators); Radiation Distribution

20040050624 Research and Technology Organization, Neuilly-sur-Seine, France
RTO Technical Publications: A Quarterly Listing
April 2004; 3 pp.; In English
Report No.(s): RTO-04-01; No Copyright; Avail: CASI; A01, Hardcopy

The titles of five reports are listed here, together with an abstract for each. The titles include: 1) 'Spectral Models of Kuiper Belt Objects and Centaurs'; 2) 'Simulation of and for Military Decision Making'; 3) 'Abundance of the Radioactive Be-10 in the Cosmic Radiation up to 2 GeV/nucleon with the Balloon-borne Instrument ISOMAX1998'; 4) 'Optical Air Flow Measurements in Flight'; 5) 'Flight Test Measurement Techniques for Laminar Flow'.
CASI
Kuiper Belt; Decision Making; Beryllium 10; Abundance; Air Flow; Optical Measurement; Flight Tests; Laminar Flow

Subject Term Index

ABLATIVE MATERIALS

Ablative Thermal Protection: An Overview – 35

Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

Materials Science Work at NASA Ames Research Center – 30

ABSORPTION SPECTRA

Shocked Clouds in the Vela Supernova Remnant – 206

The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

ABSORPTION

Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

ABUNDANCE

RTO Technical Publications: A Quarterly Listing – 228

ACCELERATION (PHYSICS)

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

ACCELERATORS

Remote Operations in a Global Accelerator Network – 149

ACCIDENT INVESTIGATION

Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

ACCRETION DISKS

A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

ACCURACY

Accuracy of Projection Methods for the Imcompressible Navier-Stokes Equation – 55

Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

ACOUSTIC ATTENUATION

Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

ACOUSTIC MEASUREMENT

Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Pulsed-Sound Measurements of the Influence of High- Amplitude Noise on Boundary-Layer Transition to Turbulence – 181

ACOUSTIC SCATTERING

Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

ACOUSTIC VELOCITY

Sound Speeds of Post-Failure Wave Glass – 37

ACOUSTICS

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

ACTIVE CONTROL

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Multi-Vehicle Experimental Platform for Distributed Coordination and Control – 40

ACTIVE GALACTIC NUCLEI

Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

ACTIVITY (BIOLOGY)

DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

ACTUATORS

An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Beauty and Charm Physics at CDF Run II – 172

CDF Silicon Vertex Detector for Run II – 177

Prompt GRB Optical Follow-up Experiments – 213

ADA (PROGRAMMING LANGUAGE)

A Comparison of Diabetes Management in a Federal Prison with the National Standards of Care Published by the ADA in 1998 – 126

ADAPTIVE CONTROL

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

ADAPTIVE OPTICS

Advanced Adaptive Optics Technology Development – 189

Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

NOAO/NSO Newsletter – 218

ADDUCTS

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

ADHESION

Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

ADSORPTION

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

ADVANCED COMPOSITION EXPLORER

Review of the Communications Research Laboratory – 225

AERIAL EXPLOSIONS

Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

AEROACOUSTICS

Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

AERODYNAMIC CONFIGURATIONS

Design, Development and Testing of Airplanes for Mars Exploration – 7

AERODYNAMICS

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia – 2

AEROSOLS

A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

INCCA: Integrated Climate and Carbon – 79

AEROSPACE ENVIRONMENTS

National Aeronautics and Space Administration STS-1 First Space Shuttle Mission Press Kit – 16

AEROSPACE MEDICINE

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

Development and Application of Self-powered Short Arm Human Centrifuge – 141

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

+Gz Protection of a New Bladder Anti-G System – 140

Space Medicine and Medical Engineering – 140

AEROSPACE PLANES

Next Generation Spacecraft, Crew Exploration Vehicle – 12

AEROSPACE SYSTEMS

A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts – 206

AEROSPACE VEHICLES

Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

AFRICA

My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

AFTERBODIES

TurMMAC Afterbody Application Challenge – 1

AGING (BIOLOGY)

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

AIR CONDITIONING

Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California – 70

AIR COOLING

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

AIR FLOW

Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

RTO Technical Publications: A Quarterly Listing – 228

AIR POLLUTION

Reducing Indoor Residential Exposures to Outdoor Pollutants – 69

AIR PURIFICATION

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

AIR QUALITY

Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California – 70

Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

AIR SEA ICE INTERACTIONS

Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

AIR TRAFFIC CONTROL

Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

AIR TRANSPORTATION

Aviation Security: Computer-Assisted Passenger Prescreening System Faces Significant Implementation Challenges – 4

Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

AIR WATER INTERACTIONS

Validation of an Urban Parameterization in a Mesoscale Model – 150

AIRCRAFT ACCIDENT INVESTIGATION

The Formation of Ethanol in Postmortem Tissues – 25

AIRCRAFT CONTROL

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

AIRCRAFT DESIGN

Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

AIRCRAFT ENGINES

Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

AIRCRAFT EQUIPMENT

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

AIRCRAFT PILOTS

The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

AIRCRAFT STRUCTURES

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

AIRCRAFT

Development of an Aircraft Operation Classification System for Louisiana's Airports – 5

AIRLINE OPERATIONS

Aviation Security: Computer-Assisted Passenger Prescreening System Faces Significant Implementation Challenges – 4

AIRPORTS

Development of an Aircraft Operation Classification System for Louisiana's Airports – 5

ALBEDO

Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Greenland Glacier Albedo Variability – 81

ALGORITHMS

Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture – 177

Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Electrotechnical Review – 40

Interior-Point l1-Penality Method for Nonlinear Optimization – 168

LSPRAY-II: A Lagrangian Spray Module – 158

Multiresolution Distance Volumes for Progressive Surface Compression – 152

Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

Novel Parallel Numerical Methods for Radiation & Neutron Transport – 184

Null Space Algorithm and Spanning Trees in Solving Darcy's Equation – 149

Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms – 150

Science and Technology Text Mining: Nonlinear Dynamics – 203

ALKALI METALS

Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

ALKALIES

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

ALLOYING

Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

ALLOYS

Connectivity in Random Grain Boundary Networks – 33

ALUMINUM ALLOYS

Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35

Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

ALUMINUM COATINGS

Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

ALUMINUM OXIDES

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

ALUMINUM

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

AMAZON REGION (SOUTH AMERICA)

Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

AMINES

Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

AMINO ACIDS

DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

ANALOGIES

Characteristic Matrices for Spherical Shell Photonic Systems – 188

Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency – 167

ANATOMY

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

ANESTHESIA

A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities – 134

A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135

A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer – 106

Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator – 132

An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center – 102

The Effect of Endotracheal Inflation Technique on Endotracheal Cuff Pressure – 138

The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

ANESTHETICS

Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator – 132

Differences in the Onset and Severity of Symptoms of Malignant Hyperthermia With Different Inhalational Anesthetics – 136

ANGULAR MOMENTUM

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

ANISOTROPY

CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

ANNOTATIONS

A Review of Narrative Methodology – 155

ANNUAL VARIATIONS

Total Lightning Activity as Observed from Space – 80

ANTENNA ARRAYS

Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks – 41

RF Photonics for Beamforming and Array Applications – 188

ANTENNA COMPONENTS

Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks – 41

ANTENNAS

Delay Estimation in Long-Code Asynchronous DS/CDMA Systems Using Multiple Antennas – 43

ANTHROPOLOGY

A Review of Narrative Methodology – 155

Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

ANTIBODIES

New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes – 115

ANTIGENS

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials – 111

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

ANTIGRAVITY

+Gz Protection of a New Bladder Anti-G System – 140

ANTIINFECTIVES AND ANTIBACTERIALS

Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

ANTIMONIDES

Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

APOLLO 13 FLIGHT

Apollo 13 - Press Kit – 222

APOLLO 14 FLIGHT

Apollo 14 - Press Kit – 222

APOLLO FLIGHTS

National Aeronautics and Space Administration STS-1 First Space Shuttle Mission Press Kit – 16

APOLLO SPACECRAFT

Apollo 13 - Press Kit – 222

Apollo 7 - Press Kit – 16

Overviews of the Apollo Program and Its Management – 10

APOPTOSIS

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

APPLICATION PROGRAMMING INTERFACE

TIGER LDRD – 170

APPROXIMATION

Approximate Splitting for Ensembles of Trees using Histograms – 152

Coherence Phenomena in Coupled Optical Resonators – 190

ARCHAEOLOGY

Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

ARCHITECTURE (COMPUTERS)

Adding Assurance to Automatically Generated Code – 161

Choosing Reputable Resources in Atomistic Peer-to-Peer Environments – 147

Latched Recurrent Neural Network – 163

Multibeam Phased Array Antennas – 191

Report on the HPSS Database Benchmark – 152

ARCTIC OCEAN

Fresh Water Content Variability in the Arctic Ocean – 82

ARCTIC REGIONS

Greenland Glacier Albedo Variability – 81

ARMED FORCES (UNITED STATES)

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

ARMED FORCES

Research on Child Abuse in the US Armed Forces – 120

ARRAYS

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

ARTERIES

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

ARTIFICIAL GRAVITY

Development and Application of Self-powered Short Arm Human Centrifuge – 141

ARTIFICIAL INTELLIGENCE

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

ARTIFICIAL SATELLITES

Atmospheric Density Dynamics and the Motion of Satellites – 12

SIM: The Satellite and Missile Mission Simulator – 12

Systematic Effects in Color Photometry Data – 13

ASSAYING

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

ASSEMBLIES

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

ASSESSMENTS

Schedule Risk Assessment – 169

ASSIMILATION

Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

ASTEROIDS

Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Recovery and Utilization of Extraterrestrial Resources – 216

ASTROMETRY

Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

ASTRONOMICAL MODELS

A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Interpretive Tools for Analysis of Coronal Images – 222

ASTRONOMY

A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR) – 60

ASTROPHYSICS

Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry – 28

Plans for Extreme Energy Cosmic Ray Observations from Space – 212

The Mystery of Gamma-Ray Bursts – 212

ASYMMETRY

An algorithm for the Asymmetric Traveling Salesman Problem – 168

Electrotechnical Review – 40

ATLANTIC OCEAN

U.S. Army Nursing Readiness: A Field Administration of the Readiness Estimate and Deployability Index (READI) in the North Atlantic Regional Medical Command (NARMC) – 101

ATMOSPHERIC CHEMISTRY

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

ATMOSPHERIC COMPOSITION

External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

ATMOSPHERIC DENSITY

Atmospheric Density Dynamics and the Motion of Satellites – 12

ATMOSPHERIC EFFECTS

Communication Channel in Urban Operations: A First Survey – 42

ATMOSPHERIC ENTRY SIMULATION

Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

ATMOSPHERIC MODELS

Atmospheric Density Dynamics and the Motion of Satellites – 12

Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Validation of Ionospheric Models – 75

ATMOSPHERIC PHYSICS

User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

Validation of an Urban Parameterization in a Mesoscale Model – 150

ATMOSPHERIC RADIATION

Greenland Glacier Albedo Variability – 81

ATMOSPHERIC SOUNDING

Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

ATMOSPHERIC TEMPERATURE

Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California – 70

ATOMIC SPECTRA

Completeness Criterion in Atomic Modeling – 179

ATOMS

Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

ATTENTION

Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

AUDITORY SIGNALS

NTT Technical Review – 47

AUGMENTATION

Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

AUSTENITE

Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

AUSTRALIA

AusGeo News – 68

AUTOMATIC CONTROL

Adding Assurance to Automatically Generated Code – 161

Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Match-bounded String Rewriting Systems – 155

Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms – 150

AUTOMATIC FLIGHT CONTROL

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

AUTONOMIC NERVOUS SYSTEM

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

BACILLUS

Brillouin Spectroscopy Data Base for Biological Threats – 205

DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

BACTERIA

Chlamydia Screening Decision Study – 130

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

BALLISTICS

Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35

BANDWIDTH

Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147

BARYONS

Baryon Operators and Spectroscopy in Lattice QCD – 170

Beauty and Charm Physics at CDF Run II – 172

BAYES THEOREM

An Introduction to Bayesian Belief Networks and their Applications to Land Operations – 166

BEAMFORMING

Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

RF Photonics for Beamforming and Array Applications – 188

BEAMS (RADIATION)

Multibeam Phased Array Antennas – 191

BEARING ALLOYS

Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

BELIEF NETWORKS

An Introduction to Bayesian Belief Networks and their Applications to Land Operations – 166

BELLMAN THEORY

Stochastic Optimal Control via Bellman's Principle – 164

BERYLLIUM 10

RTO Technical Publications: A Quarterly Listing – 228

BIAS

Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

BIBLIOGRAPHIES

A Bibliography of Aspect-Oriented Software Development, Version 1.1 – 200

A Review of Narrative Methodology – 155

Lunar and Planetary Bases, Habitats, and Colonies – 11

NASA Langley Scientific and Technical Information Output-2002 – 201

Next Generation Spacecraft, Crew Exploration Vehicle – 12

Overviews of the Apollo Program and Its Management – 10

Recovery and Utilization of Extraterrestrial Resources – 216

Roving Vehicles for Lunar and Planetary Exploration – 11

US National Security and Strategy. A Selected Bibliography – 204

BILLETS

Processing and Properties of HfB2 Based Materials – 29

BINARY MIXTURES

Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture – 177

Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

BINDERS (MATERIALS)

CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

BINOMIALS

Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency – 167

BIOCHEMICAL FUEL CELLS

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

BIOCHEMISTRY

Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

BIODYNAMICS

Biomechanics of Occupational Shoulder Injuries, Final Performance Report – 146

BIOELECTRIC POTENTIAL

The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

BIOLOGICAL EFFECTS

Brillouin Spectroscopy Data Base for Biological Threats – 205

BIOMASS

Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

BIOPHYSICS

Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

BIOSYNTHESIS
Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

BLACK HOLES (ASTRONOMY)
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

BLADDER
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

+Gz Protection of a New Bladder Anti-G System – 140

BLAZARS
Frequency-Dependent Time Lags in Three Blazars – 215

BLOCK DIAGRAMS
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

BLOCKING
The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

BLOOD FLOW
Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

BLOOD PUMPS
A Simulation Study on Cardiac Assist Device: Hemopump – 145

BLOOD VOLUME
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

BLOOD
Blood Sample Reliability Using Infusing Intravenous Lines – 129

BLUNT BODIES
Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

BODY MEASUREMENT (BIOLOGY)
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

BODY WEIGHT
Changes in Weight Experienced by Female Inmates in the Federal Bureau of Prisons – 130

My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

BODY-WING AND TAIL CONFIGURATIONS
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

BOLTED JOINTS
Switchyard Enclosure Bolted Connection Calculations – 169

BOLTS
Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

BOLTZMANN TRANSPORT EQUATION
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods – 166

Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

Why are the P(n) and S(n) Methods Equivalent – 175

BOMBER AIRCRAFT
Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

BONE DEMINERALIZATION
DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

BONES
Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

BORIDES
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

BOTTLES
Blood Sample Reliability Using Infusing Intravenous Lines – 129

BOUNDARIES
Elliptic Systems of Partial Differential Equations Generated by Vector Vields Which Degenerate at the Boundary of the Domain – 154

Pressurization Analysis of Containers in the SAFKEG 3940A Package in KAMS (U) – 227

BOUNDARY CONDITIONS
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

Three-Dimensional Coronal Density Structure: 1. Model – 223

Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

BOUNDARY LAYER TRANSITION
Pulsed-Sound Measurements of the Influence of High- Amplitude Noise on Boundary-Layer Transition to Turbulence – 181

BOUNDARY LAYERS
Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

The Boundary Layer Over Turbine Blade Models with Realistic Rough Surfaces – 56

BRAGG ANGLE
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

BRAGG REFLECTORS
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

BRAIN DAMAGE
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

BRAIN
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

BRIDGMAN METHOD
Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment – 164

BRIGHTNESS
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

BRITTLENESS
Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

BROADBAND
Optics Microwave Interactions – 187

BRUSHES
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

BUBBLES
Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

BURSTS
Accreting Neutron Stars as Astrophysical Laboratories – 209

Low-mass X-ray Binaries with RXTE – 211

BYPASS RATIO

High-Fidelity Three-Dimensional Simulation of the GE90 – 2

C++ (PROGRAMMING LANGUAGE)

Static Analysis of C Programs – 164

CALCIFEROL

Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel – 107

CALCIUM PHOSPHATES

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

CALCIUM

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

CALIBRATING

[Analysis of Observations from Mars Global Surveyor] – 219

Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

CALORIMETERS

Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

CAMERAS

Nanosecond Frame Cameras – 48

WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

CANCER

A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer – 106

Activation of ATM by DNA Damaging Agents – 124

Advanced Cancer Detection Center – 95

Analysis of AND-34, A Novel p130Cas-Binding GDP Exchange Factor Implicated in the Development of Tamoxifen Resistance in Human Breast Cancer – 111

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer – 123

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Characterization of the Chicken Ovarian Cancer Model – 88

Characterization of the Hen as a Model for Human Ovarian Cancer – 95

Cyclin Dependent Kinase Inhibitors as Targets in Ovarian Cancer – 94

Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Enhancing the Effectiveness of Breast Cancer Immunotherapy Through Manipulation of the T Cell Cytoskeleton – 113

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials – 111

Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

Malignants In The Body Politic: Redefining War Through Metaphor – 128

Mammary Stromal Effects on Epithelial Differentiation and Expression of ESX and ErbB2 (HER2/neu) – 114

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

Ovarian Cancer Risk and Survival in BRCA 1/2 Carriers – 93

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment – 91

Peripheral Benzodiazepine Receptor (PBR) in Human Breast Cancer – 94

Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer – 97

Phosphoinositide 3-Kinase/AKT1 Pathway and Human Ovarian Cancer – 94

Quest: A New Approach to Molecular Staging of Tumors – 125

Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy – 96

Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility – 87

Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

Targeting Angiogenic Factors Contributing to Etiology and Progression of Human Ovarian Cancer – 115

Targeting Breast Cancer With Anti HER2/neu Diabodies – 105

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

The Effect of Prostate Cancer Support Groups on Uncertainty – 138

The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

Vitronectin and Integrin alpha(v)Beta3 in Ovarian Carcinoma – 87

CARBOHYDRATES

Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

CARBON DIOXIDE

[CO2 Budget and Atmospheric Rectification (COBRA) Over North America] – 78

INCCA: Integrated Climate and Carbon – 79

[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

CARBON FIBERS

Development of Ceramic Matrix Composites For High Temperature Applications – 23

CARBON ISOTOPES

Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

CARBON NANOTUBES

Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

CARBONACEOUS MATERIALS

Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

CARBON

Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

CARCINOGENS

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

CARDIOVASCULAR SYSTEM

A Simulation Study on Cardiac Assist Device: Hemopump – 145

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Development and Application of Self-powered Short Arm Human Centrifuge – 141

CARTESIAN COORDINATES

Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

CATALOGS (PUBLICATIONS)

A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

CATALYTIC ACTIVITY

Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

CAVITIES

Low and Intermediate Beta Cavity Design-A Tutorial – 179

CAVITY RESONATORS

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

CELESTIAL BODIES

Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

CELL DIVISION

Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

CELL MEMBRANES (BIOLOGY)

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

CELLS (BIOLOGY)

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Expression Profiling of Cell Lines Expressing Regulated NF2 Transcripts – 99

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

Mitochondrial Mechanisms of Neuronal Injury – 106

Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

Quest: A New Approach to Molecular Staging of Tumors – 125

Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

Vitronectin and Integrin alpha(v)Beta3 in Ovarian Carcinoma – 87

CENTRAL NERVOUS SYSTEM

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

CENTRIFUGAL COMPRESSORS

Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

CERAMIC COATINGS

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

CERAMIC MATRIX COMPOSITES

Development of Ceramic Matrix Composites For High Temperature Applications – 23

SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

CERAMICS

Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

Ceramic Foams for TPS Applications – 15

Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs – 36

Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

Ti-Cr-Al-O Thin Film Resistors – 37

CHAIN REACTIONS (CHEMISTRY)

Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

CHANNELS (DATA TRANSMISSION)

Lattice Based Coding Schemes – 169

CHAOS

Microwave Chaotic Sources – 52

CHARTS

A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

CHEMICAL EQUILIBRIUM

Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

CHEMICAL EXPLOSIONS

Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

CHEMICAL REACTIONS
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

CHEMICAL WARFARE
Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

CHEMISTRY
Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry – 28

CHEMOTHERAPY
Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Targeting Breast Cancer With Anti HER2/neu Diabodies – 105

CHICKENS
Characterization of the Chicken Ovarian Cancer Model – 88

CHILDREN
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

Research on Child Abuse in the US Armed Forces – 120

Texas Children's Bicycle Helmet Bill Analysis – 147

CHINA
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

CHINESE SPACE PROGRAM
Space Medicine and Medical Engineering – 140

CHIPS (ELECTRONICS)
Development of Data Acquisition Card in Exercise-ECG Detection System – 144

CHROMOSOMES
Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

CIRCUITS
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

CIRCULATORY SYSTEM
A Simulation Study on Cardiac Assist Device: Hemopump – 145

CITIES
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

Communication Channel in Urban Operations: A First Survey – 42

CLAIMING
The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time – 101

CLASSIFICATIONS
Approximate Splitting for Ensembles of Trees using Histograms – 152

Development of an Aircraft Operation Classification System for Louisiana's Airports – 5

Procedure for Estimation of Error-rate of Classification Algorithms – 202

CLEAN ENERGY
Learning by Doing: The Evolution of State Support for Photovoltaics – 68

CLIMATE CHANGE
Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

CLIMATE
Greenland Glacier Albedo Variability – 81

INCCA: Integrated Climate and Carbon – 79

CLINICAL MEDICINE
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials – 111

Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Phase II-SOF Knowledge Coupler-Based Phase I XML Schema – 116

Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients – 107

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

CLONING (BIOLOGY)
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

CLOSTRIDIUM BOTULINUM
Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

CLOUD PHYSICS
Ice Particle Impact on Cloud Water Content Instrumentation – 58

CLOUDS (METEOROLOGY)
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

CLOUDS
Shocked Clouds in the Vela Supernova Remnant – 206

CLOUD-TO-GROUND DISCHARGES
Global Lightning Activity – 79

CLUSTER ANALYSIS
Bipartite Graph Partitioning and Data Clustering – 149

COATINGS
Ti-Cr-Al-O Thin Film Resistors – 37

COATING
Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

COCKPITS
The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

CODE DIVISION MULTIPLE ACCESS
Delay Estimation in Long-Code Asynchronous DS/CDMA Systems Using Multiple Antennas – 43

CODERS
Assessing the Value of Professional Coders in Ambulatory Healthcare Systems – 104

CODING
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Context Dependent Digital Image Shape Coding – 58

Improving the Quality of Medical Coding Data at Naval Hospital Bremerton – 103

Lattice Based Coding Schemes – 169

Video Object Shape Coding Using Control Point Optimization – 59

COGNITION

CmapTools: A Software Environment for Knowledge Modeling and Sharing – 157

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

COHERENCE

Coherence Phenomena in Coupled Optical Resonators – 190

COLD PLASMAS

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

COLLISIONS

Dynamics of Droplet Collision and Flame Motion – 57

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Search for New Particles at CDF II – 178

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

COLOR

Systematic Effects in Color Photometry Data – 13

COLUMBIA (ORBITER)

Columbia Shuttle Recovery Operations, April 1, 2003 – 14

Wing Leading Edge Debris Analysis – 7

COMBAT

Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

COMBUSTION CHAMBERS

High-Fidelity Three-Dimensional Simulation of the GE90 – 2

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

COMBUSTION

Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

NOx, Fine Particle and Toxic Metal Emissions from the Combustion of Sewage Sludge/Coal Mixtures: A Systematic Assessment – 72

COMMAND AND CONTROL

Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Communication Channel in Urban Operations: A First Survey – 42

Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

COMMERCE

A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital – 91

Cybercrime against Businesses – 151

COMMERCIAL AIRCRAFT

Aviation Security: Computer-Assisted Passenger Prescreening System Faces Significant Implementation Challenges – 4

COMMODITIES

Mineral Commodity Summaries, 2004 – 20

COMMUNICATION NETWORKS

Fiber Optic Distribution Networks for Military Applications – 45

Load Balancing by MPLS in Differentiated Services Networks – 43

Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems – 44

COMMUNICATION

Emergency Communication Triangle – 46

COMPILERS

Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

COMPLEX SYSTEMS

Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

COMPOSITE STRUCTURES

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Global Failure Modes in Composite Structures for High Altitudes – 24

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

COMPOSITION (PROPERTY)

The Composition and Physical Structure of the Io Torus and Atmosphere – 222

COMPRESSORS

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

COMPUTATIONAL ELECTROMAGNETICS

TIGER LDRD – 170

COMPUTATIONAL FLUID DYNAMICS

High-Fidelity Three-Dimensional Simulation of the GE90 – 2

TurMMAC Afterbody Application Challenge – 1

COMPUTATIONAL GRIDS

Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Image-Driven Mesh Optimization – 149

COMPUTATION

Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

COMPUTER AIDED DESIGN

Surface Generation and Cartesian Mesh Support – 160

Watertight Anisotropic Surface Meshing Using Quadrilateral Patches – 160

COMPUTER ANIMATION

Rapid Prototyping in PVS – 155

COMPUTER GRAPHICS

Image-Driven Mesh Optimization – 149

SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

COMPUTER NETWORKS

Choosing Reputable Resources in Atomistic Peer-to-Peer Environments – 147

Cybercrime against Businesses – 151

COMPUTER PROGRAMMING

A Bibliography of Aspect-Oriented Software Development, Version 1.1 – 200

Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA – 204

Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

Report on the HPSS Database Benchmark – 152

COMPUTER PROGRAMS

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

A Search for the Solar Sources of High-Speed Streams – 223

ASCI PSE Milepost: Run-Time Systems Performance Tests – 156

CmapTools: A Software Environment for Knowledge Modeling and Sharing – 157

Computational Data Compression for Effective Storage/Retrieval – 160

Free-Piston Stirling Convertor Controller Development at NASA Glenn Research Center – 59

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

hypre: A Library of High Performance Preconditioners – 153

Platforms in Networks: Software Architecture and Operator Services – 41

PVODE Trio: PVODE, KINSOL, and IDA – 154

RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data – 178

COMPUTER SECURITY

Critical Infrastructure Protection: Challenges and Efforts to Secure Control Systems – 153

COMPUTER SYSTEMS PERFORMANCE

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

ASCI PSE Milepost: Run-Time Systems Performance Tests – 156

COMPUTER SYSTEMS PROGRAMS

Adding Assurance to Automatically Generated Code – 161

Match-bounded String Rewriting Systems – 155

Rapid Prototyping in PVS – 155

COMPUTER TECHNIQUES

Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

Electrotechnical Review – 40

Space-based Science Operations Grid Prototype – 158

COMPUTER VISION

SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

COMPUTERIZED SIMULATION

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

High-Fidelity Three-Dimensional Simulation of the GE90 – 2

Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation – 130

SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

SIM: The Satellite and Missile Mission Simulator – 12

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Statistical Error in Particle Simulations of Low Mach Number Flows – 56

TIGER LDRD – 170

Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

CONCENTRIC CYLINDERS

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

CONCRETE STRUCTURES

Repair of Damaged Concrete Structures Using Prepreg Composites – 24

CONCURRENT ENGINEERING

Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

CONDENSATES

[Analysis of Observations from Mars Global Surveyor] – 219

CONDENSED MATTER PHYSICS

Ultrafast X-Ray Science at the Advanced Light Source – 171

CONDUCTIVITY

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Metallization of Hydrogen and Other Small Molecules at 100 GPa Pressures – 175

CONDUCTORS

AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics – 49

CONES

Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

CONFERENCES

4TH International Conference on Antenna Theory and Techniques. Volume 1 – 51

First International Mobile IPR Workshop. Rights Management of Information Products on the Mobile Internet held August 27-28, 2003, Helsinki, Finland – 44

International Conference on Phenomena in Ionized Gases (26th) Held in Greifswald, Germany on 15-20 July 2003. Proceedings, Volume 4 – 196

NASA Langley Scientific and Technical Information Output-2002 – 201

CONFINEMENT

Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

CONFORMAL MAPPING

Weighted Bergman Spaces and the Integral Means Spectrum of Conformal Mappings – 148

CONICAL BODIES

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

CONICAL NOZZLES

Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

CONJUGATE GRADIENT METHOD

Stopping Citerion for the Conjugate Gradient Algorithm in a Finite Element Method Framework – 148

CONJUGATION

Conjugated Polyelectrolytes: Synthesis and Applications – 28

CONSERVATION LAWS

Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws – 148

CONSTANTS

Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

CONSTRUCTION

A CBO PAPER: Paying for Iraq'a Reconstruction – 65

CONTAINERLESS MELTS

Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

CONTAMINANTS

Health Effects Support Document for Manganese (February 2003) – 27

CONTINUOUS RADIATION

Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

CONTROL EQUIPMENT

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

CONTROL SIMULATION

Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

CONTROL THEORY

Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

CONTROLLED ATMOSPHERES

Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

CONVECTION
Control of Convection in Containerless Processing – 21
Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

CONVECTIVE FLOW
Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

CONVERGENCE
Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

CONVERTERS
Free-Piston Stirling Convertor Controller Development at NASA Glenn Research Center – 59

COOLING SYSTEMS
Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

COOLING
Control of Convection in Containerless Processing – 21

COORDINATION
Multi-Vehicle Experimental Platform for Distributed Coordination and Control – 40

COPOLYMERS
Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

COPPER ALLOYS
Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

COPPER FLUORIDES
Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

COPPER
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

CORES
Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

CORNEA
Corneal Damage From Mid-Infrared Laser Radiation – 105

CORONAL HOLES
Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223
Understanding the Solar Sources of In Situ Observations – 226

CORONAL MASS EJECTION
A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225
Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78
Forecasting Coronal Mass Ejections from Magnetograms – 225
Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

CORONARY ARTERY DISEASE
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

CORONARY CIRCULATION
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

CORONAS
A Search for the Solar Sources of High-Speed Streams – 223
An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214
Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

CORRELATION
Total Lightning Activity as Observed from Space – 80

CORRELATORS
Baryon Operators and Spectroscopy in Lattice QCD – 170

COSMIC DUST
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

COSMIC RAYS
Plans for Extreme Energy Cosmic Ray Observations from Space – 212

COSMOLOGY
The Mystery of Gamma-Ray Bursts – 212

COST ANALYSIS
Cost Benefit Analysis of Providing Level II Trauma Care at William Beaumont Army Medical Center (WBAMC) – 117
TRICARE Plus: A Cost, Capacity and Enrollment Analysis – 103

COST EFFECTIVENESS
Cost Benefit Analysis of Providing Level II Trauma Care at William Beaumont Army Medical Center (WBAMC) – 117
Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

COST ESTIMATES
A CBO PAPER: Paying for Iraq'a Reconstruction – 65

COSTS
A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97
An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center – 102
Static Analysis of C Programs – 164

COUPLED MODES
Coherence Phenomena in Coupled Optical Resonators – 190

COUPLERS
Phase II-SOF Knowledge Coupler-Based Phase I XML Schema – 116

COVALENCE
Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

CP VIOLATION
Beauty and Charm Physics at CDF Run II – 172

CRACK PROPAGATION
Ballistic Impact of Braided Composites With a Soft Projectile – 62
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32
Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment – 33
Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

CRACKS
Global Failure Modes in Composite Structures for High Altitudes – 24
Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

CREEP PROPERTIES
Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19
Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

CROP GROWTH
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

CROSS SECTIONS
POINT 2003: A Temperature Dependent ENDF/B-VI, Release 8 Cross Section Library – 173

CROSSED FIELDS
Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties – 191

CRUDE OIL
AusGeo News – 68

CRYOGENIC FLUIDS
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

CRYOGENIC ROCKET PROPELLANTS
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

CRYOGENIC TEMPERATURE
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

CRYOGENICS
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

CRYSTAL GROWTH
Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment – 164

CRYSTAL STRUCTURE
Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

CRYSTALS
Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

KDP Impurity Data – 178

Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

CUFFS
The Effect of Endotracheal Inflation Technique on Endotracheal Cuff Pressure – 138

CURING
Repair of Damaged Concrete Structures Using Prepreg Composites – 24

CURRENT DISTRIBUTION
Skin Effect Impact on Current Density Distibution in OPGW Cables – 49

CYLINDERS
PEPC LRU: Ball Support Assembly – 186

CYLINDRICAL BODIES
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

CYTOLOGY
Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

DAMAGE ASSESSMENT
Wing Leading Edge Debris Analysis – 7

DAMAGE
Activation of ATM by DNA Damaging Agents – 124

Corneal Damage From Mid-Infrared Laser Radiation – 105

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

DATA ACQUISITION
A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Cybercrime against Businesses – 151

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Review of the Communications Research Laboratory – 225

DATA BASES
Brillouin Spectroscopy Data Base for Biological Threats – 205

Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

Officer Street-to-Fleet Database: Expanding Capabilities – 205

Phase II-SOF Knowledge Coupler-Based Phase I XML Schema – 116

Quantitative Infrared Reference Library. Library 2 – 204

Report on the HPSS Database Benchmark – 152

Science and Technology Text Mining: Nonlinear Dynamics – 203

User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

DATA COMPRESSION
Computational Data Compression for Effective Storage/Retrieval – 160

DATA MANAGEMENT
A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

[Analysis of Observations from Mars Global Surveyor] – 219

DATA MINING
Intrusion Detection Using Data Mining Techniques – 60

Procedure for Estimation of Error-rate of Classification Algorithms – 202

DATA PROCESSING
Analysis of the Military Effectiveness of Future C2 Concepts and Systems – 162

Approximate Splitting for Ensembles of Trees using Histograms – 152

Bipartite Graph Partitioning and Data Clustering – 149

Computational Data Compression for Effective Storage/Retrieval – 160

Multiresolution Distance Volumes for Progressive Surface Compression – 152

Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia – 2

Space-based Science Operations Grid Prototype – 158

Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

DATA RETRIEVAL
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

DATA STORAGE
Computational Data Compression for Effective Storage/Retrieval – 160

Report on the HPSS Database Benchmark – 152

RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data – 178

Space-based Science Operations Grid Prototype – 158

DATA STRUCTURES
Mineral Commodity Summaries, 2004 – 20

DATA SYSTEMS
The Super Lightweight Interchangeable Carrier (SLIC) Project – 15

TRMM Data from the Goddard Earth Sciences (GES) DISC DAAC: Tropical Rainfall Measuring Mission (TRMM) – 76

DATA TRANSMISSION
PVODE Trio: PVODE, KINSOL, and IDA – 154

DEATH
Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

DEBRIS
Columbia Shuttle Recovery Operations, April 1, 2003 – 14

Wing Leading Edge Debris Analysis – 7

DECISION MAKING

An Introduction to Bayesian Belief Networks and their Applications to Land Operations – 166

Analysis of the Military Effectiveness of Future C2 Concepts and Systems – 162

Chlamydia Screening Decision Study – 130

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

RTO Technical Publications: A Quarterly Listing – 228

The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

DECISION SUPPORT SYSTEMS

Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

Getting the Most from the Twin Mars Rovers – 219

DECOMPOSITION

Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

DECONTAMINATION

Stability of ClO2 as a Product of Gas Phase Decontamination Treatments – 38

DEFENSE PROGRAM

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

DEFORMATION

Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al – 34

DEGRADATION

Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

DEHYDROGENATION

Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

DELIVERY

The Super Lightweight Interchangeable Carrier (SLIC) Project – 15

DELPHI METHOD (FORECASTING)

A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

DEMODULATORS

Journal of Spacecraft Technology – 16

DENSITY DISTRIBUTION

Electrotechnical Review – 40

Interpretive Tools for Analysis of Coronal Images – 222

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

DENSITY (MASS/VOLUME)

Three-Dimensional Coronal Density Structure: 1. Model – 223

DENSITY MEASUREMENT

Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

DEOXYRIBONUCLEIC ACID

Activation of ATM by DNA Damaging Agents – 124

Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95

Mitochondrial Mechanisms of Neuronal Injury – 106

DEPLOYMENT

Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

Telechemistry Projecting Laboratory Expertise to a Deployed TAML – 47

DEPOSITION

Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

DEPOSITS

Wing Leading Edge Debris Analysis – 7

DESIGN ANALYSIS

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

Preliminary Radiation Shielding Design for BOOMERANG – 176

DESIGN OPTIMIZATION

A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts – 206

Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

DETECTION

Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

Biological and Silicon Modeling of Moving Target Detection in Insects – 59

Brillouin Spectroscopy Data Base for Biological Threats – 205

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Intrusion Detection Using Data Mining Techniques – 60

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

DETECTORS

Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions – 19

Search for New Phenomena in CDF – 178

DETONATION WAVES

Shocked Clouds in the Vela Supernova Remnant – 206

DEUTERIUM COMPOUNDS

KDP Impurity Data – 178

DIAGNOSIS

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics – 87

Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment – 91

Quest: A New Approach to Molecular Staging of Tumors – 125

DIAMONDS

Review of Navy Program to Develop Optical Quality Diamond Windows and Domes – 198

DIATOMIC MOLECULES

Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

DIELECTRICS

Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

DIGITAL ELECTRONICS

Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

DISABILITIES

Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

DISEASES

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114

Kainate Receptors in the Striatum: Implications for Excitotoxicity in Huntington's Disease – 108

Malignants In The Body Politic: Redefining War Through Metaphor – 128

Mechanisms of a-Synuclein Aggregation and Toxicity – 107

Mitochondrial Mechanisms of Neuronal Injury – 106

One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

DISORDERS

Proton MR Spectroscopic Imaging in NF-1 – 127

DISRUPTING

Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

DISSIPATION

High Order Filter Methods for Shock/Turbulence MHD Flows – 53

DISTANCE

Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

DISTRIBUTED PARAMETER SYSTEMS

Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Multi-Vehicle Experimental Platform for Distributed Coordination and Control – 40

DISTRIBUTING

Global Lightning Activity – 79

DIVERTERS

Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Turbulence Simulations of X-point Physics on the L-H Transitions – 192

DOPAMINE

Mitochondrial Mechanisms of Neuronal Injury – 106

DOPED CRYSTALS

Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry – 73

DOSAGE

Ergonomic Risk Factors and Cumulative Trauma Disorders – 146

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

Health Effects Support Document for Manganese (February 2003) – 27

Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

DOSIMETERS

Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

DRAG REDUCTION

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

DRILLING

Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

DROP SIZE

A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

DROPS (LIQUIDS)

Dynamics of Droplet Collision and Flame Motion – 57

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

DROSOPHILA

High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

DURABILITY

Repair of Damaged Concrete Structures Using Prepreg Composites – 24

DUST

[Analysis of Observations from Mars Global Surveyor] – 219

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

DWARF NOVAE

Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

DYNAMIC CHARACTERISTICS

Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

DYNAMIC MODELS

Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

DYNAMIC RESPONSE

Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

DYNAMIC STRUCTURAL ANALYSIS

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Ultrafast X-Ray Science at the Advanced Light Source – 171

EARTH GRAVITATION

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

Quality Assessment of Satellite-Based Global Gravity Field Models – 42

EARTH HYDROSPHERE

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

EARTH IONOSPHERE

Validation of Ionospheric Models – 75

EARTH MAGNETOSPHERE

A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

EARTH OBSERVATIONS (FROM SPACE)

Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

Plans for Extreme Energy Cosmic Ray Observations from Space – 212

Total Lightning Activity as Observed from Space – 81

EARTH OBSERVING SYSTEM (EOS)

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

EARTH ROTATION

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

EARTH SCIENCES

Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

EARTHQUAKE RESISTANT STRUCTURES

Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

EARTHQUAKES

Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

EASTERN HEMISPHERE

Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

EDUCATION

A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135

A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts – 206

Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Centennial of Flight Educational Outreach – 227

Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

Overview of Future of Probabilistic Methods and RMSL Technology and the Probabilistic Methods Education Initiative for the US Army at the SAE G-11 Meeting – 202

University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

EJECTA

Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

ELECTRIC FIELDS

Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

ELECTRIC POTENTIAL

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Journal of Spacecraft Technology – 16

Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

ELECTRIC POWER TRANSMISSION

Distributed Electrical Power Generation: Summary of Alternative Available Technologies – 68

ELECTRIC PROPULSION

An Overview of the Air Force's Electric Propulsion Program – 13

ELECTRICAL ENGINEERING

Helsinki University of Technology Deparment of Electrical and Communications Engineering, Electron Physics Laboratory Annual Report 2001 – 171

ELECTRICAL PROPERTIES

Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

ELECTRICAL RESISTIVITY

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

ELECTROCARDIOGRAPHY

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

ELECTROCATALYSTS

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

ELECTROCHEMICAL SYNTHESIS

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

ELECTROCHEMISTRY

Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry – 73

ELECTRODES

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces – 18

ELECTRODYNAMICS

Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

ELECTROLYTES

Conjugated Polyelectrolytes: Synthesis and Applications – 28

ELECTROLYTIC CELLS

NTT Technical Review – 47

ELECTROMAGNETIC FIELDS

Investigation of the Electromagnetic Field Distribution in an Undermoded Reverberation Chamber – 48

ELECTROMAGNETIC INTERFERENCE

Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach – 41

ELECTROMAGNETIC PROPERTIES

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

ELECTROMAGNETIC RADIATION

Corneal Damage From Mid-Infrared Laser Radiation – 105

Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

ELECTROMAGNETISM

4TH International Conference on Antenna Theory and Techniques. Volume 1 – 51

ELECTROMECHANICAL DEVICES
Design Methods for Machinery Emulators – 63

ELECTROMECHANICS
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

ELECTRON BEAM WELDING
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

ELECTRON BEAMS
Composite Target Concept for Multi-Pulse Radiography – 172

Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

ELECTRON DENSITY (CONCENTRATION)
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

ELECTRON ENERGY
Spheromak Formation Studies in SSPX – 192

ELECTRON TRANSFER
Large Amplitude Vibrational Influence on Electron Transfer Reactions – 60

ELECTRONIC EQUIPMENT
Comparison between High Level Radiated Susceptibility Tests and Coupling Measurements – 49

ELECTRONIC WARFARE
The Information Flow in Network Based Defense – 43

ELECTRON-ION RECOMBINATION
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

ELECTRONS
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

ELECTRO-OPTICS
Optics Microwave Interactions – 187

ELECTROPHYSIOLOGY
Eletrophysiological Changes in NF1 – 88

ELECTROSTATIC PRECIPITATORS
Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

ELECTROSTATICS
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

ELLIPTIC DIFFERENTIAL EQUATIONS
Elliptic Systems of Partial Differential Equations Generated by Vector Vields Which Degenerate at the Boundary of the Domain – 154

ELLIPTICAL GALAXIES
Over-Luminous Elliptical Galaxies – 210

EMERGENCIES
An Analysis of Emergency Department Overcrowding at The Johns Hopkins Hospital – 98

Cost Benefit Analysis of Providing Level II Trauma Care at William Beaumont Army Medical Center (WBAMC) – 117

Emergency Communication Triangle – 46

Environmental Assessment for the NASA First Response Facility – 69

Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics – 87

Proceedings of the Workshop on Lessons from the World Trade Center Terrorist Attack: Management of Complex Civil Emergencies and Terrorism-Resistant Civil Engineering Design – 203

Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation – 130

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

EMISSION SPECTRA
RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data – 178

EMISSION
Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

EMISSIVITY
Completeness Criterion in Atomic Modeling – 179

ENCAPSULATING
Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

ENCEPHALITIS
Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

ENDOTHELIUM
Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

ENERGETIC PARTICLES
A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

ENERGY CONSUMPTION
Properties of Materials for Designing Filters at Optical Frequencies – 190

ENERGY SPECTRA
Plans for Extreme Energy Cosmic Ray Observations from Space – 212

ENERGY TRANSFER
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

ENGINE DESIGN
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

ENGINE NOISE
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

ENVIRONMENT EFFECTS
Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

ENVIRONMENT MANAGEMENT
Environmental Assessment for the NASA First Response Facility – 69

Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

ENVIRONMENT SIMULATION
Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

ENVIRONMENTAL MONITORING
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

ENVIRONMENTAL QUALITY
Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California – 70

ENZYME ACTIVITY
Cyclin Dependent Kinase Inhibitors as Targets in Ovarian Cancer – 94

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

ENZYMES

Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

EPIDEMIOLOGY

An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Ergonomic Risk Factors and Cumulative Trauma Disorders – 146

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

EPITAXY

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

EPOXY COMPOUNDS

Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

EPOXY RESINS

Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

EQUATIONS OF STATE

LEOS Interpolation Package – 174

ERROR ANALYSIS

Electrotechnical Review – 40

Procedure for Estimation of Error-rate of Classification Algorithms – 202

ESCAPE VELOCITY

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

ESTIMATES

Greenland Glacier Albedo Variability – 81

NLC Interaction Region Layout and Background Estimates – 179

ETHNIC FACTORS

Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel – 107

ETHYL COMPOUNDS

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

ETIOLOGY

Targeting Angiogenic Factors Contributing to Etiology and Progression of Human Ovarian Cancer – 115

EUTECTICS

Batch Preheat for Glass and Related Furnace Processing Operations – 37

EVALUATION

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Performance Evaluation of O-Rings in the SAFKEG 3940A Package in KAMS (U) – 227

EVAPORATION RATE

Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

EVOKED RESPONSE (PSYCHOPHYSIOLOGY)

The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

EVOLUTION (DEVELOPMENT)

Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74

Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

EXCITATION

Saturated Output Tabletop X-ray Lasers – 189

Shocked Clouds in the Vela Supernova Remnant – 206

EXERCISE PHYSIOLOGY

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

EXOBIOLOGY

CmapTools: A Software Environment for Knowledge Modeling and Sharing – 157

EXPERIMENTATION

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

EXPERT SYSTEMS

An Architecture for Intelligent Systems Based on Smart Sensors – 11

Expert System Utilization for Behavioral Health – 125

EXPLORATION

Self-Sustaining Robotic Ecologies and Space Architecture – 162

EXPLOSIVES

Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

EXPOSURE

A Health Hazard Assessment for Blast Overpressure Exposures – 104

Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Ergonomic Risk Factors and Cumulative Trauma Disorders – 146

Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel – 107

Health Effects Support Document for Manganese (February 2003) – 27

Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam – 139

EXTINCTION

Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

EXTRACTION

Saturated Output Tabletop X-ray Lasers – 189

EXTRATERRESTRIAL RESOURCES

Recovery and Utilization of Extraterrestrial Resources – 216

EXTREME ULTRAVIOLET RADIATION

Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

Preparations for EUV Interferometry of the 0.3 NA MET Optic – 189

EXTREMELY LOW FREQUENCIES

Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

EYE (ANATOMY)

Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

FABRICATION

Design and Implementation for the Prototype of a Microstimulator – 52

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

FABRICS
Repair of Damaged Concrete Structures Using Prepreg Composites – 24

FABRY-PEROT INTERFEROMETERS
Brillouin Spectroscopy Data Base for Biological Threats – 205

FAILURE MODES
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Global Failure Modes in Composite Structures for High Altitudes – 24

FAILURE
Sound Speeds of Post-Failure Wave Glass – 37

FAINT OBJECTS
Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

FARM CROPS
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

FATIGUE (MATERIALS)
Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment – 33

FAULT DETECTION
An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake – 66

Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

FAULT TOLERANCE
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

FEEDBACK CONTROL
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

FEEDBACK
Feedback From Video From Virtual Reality Navigation – 154

FEMALES
An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Changes in Weight Experienced by Female Inmates in the Federal Bureau of Prisons – 130

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

FIBER COMPOSITES
Global Failure Modes in Composite Structures for High Altitudes – 24

[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

FIBER OPTICS
Fiber Optic Distribution Networks for Military Applications – 45

Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

FIBER ORIENTATION
Repair of Damaged Concrete Structures Using Prepreg Composites – 24

FIELD EFFECT TRANSISTORS
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

FIELD STRENGTH
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

FIELD TESTS
NTT Technical Review – 47

FIELD-PROGRAMMABLE GATE ARRAYS
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

FILLERS
A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

FILTERS
High Order Filter Methods for Shock/Turbulence MHD Flows – 53

FINITE DIFFERENCE THEORY
Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

FINITE ELEMENT METHOD
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods – 166

Null Space Algorithm and Spanning Trees in Solving Darcy's Equation – 149

Stopping Citerion for the Conjugate Gradient Algorithm in a Finite Element Method Framework – 148

FIXTURES
Mechanical Engineering Safety Note - PEPC Spreader Bar Assembly – 185

FLAME PROPAGATION
Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

FLAMES
Dynamics of Droplet Collision and Flame Motion – 57

Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

FLANGES
Switchyard Enclosure Bolted Connection Calculations – 169

FLEXIBILITY
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

FLIGHT CHARACTERISTICS
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

FLIGHT PLANS
Apollo 7 - Press Kit – 16

FLIGHT TEST VEHICLES
Design, Development and Testing of Airplanes for Mars Exploration – 7

FLIGHT TESTS
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

National Aeronautics and Space Administration STS-1 First Space Shuttle Mission Press Kit – 16

RTO Technical Publications: A Quarterly Listing – 228

FLOW CHARACTERISTICS
LSPRAY-II: A Lagrangian Spray Module – 158

FLOW DISTRIBUTION
Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

TurMMAC Afterbody Application Challenge – 1

FLOW NOISE
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

FLOW VELOCITY
Control of Convection in Containerless Processing – 21

FLOW VISUALIZATION
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

FLUE GASES
Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry – 73

FLUID DYNAMICS
Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency – 167

Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

FLUORINATION
Stability of ClO2 as a Product of Gas Phase Decontamination Treatments – 38

FLUX DENSITY
Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

Inertial Fusion and High-Energy-Density Science in the USA – 195

FOAMS

Ceramic Foams for TPS Applications – 15

Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

FOIL BEARINGS

Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

FOOD

System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

FORMATION FLYING

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

FOURIER TRANSFORMATION

Quantitative Infrared Reference Library. Library 2 – 204

FRACTURE MECHANICS

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

FRACTURING

Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

FREE ELECTRONS

Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases – 174

FREE-SPACE OPTICAL COMMUNICATION

Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

FREQUENCIES

Frequency-Dependent Time Lags in Three Blazars – 215

Properties of Materials for Designing Filters at Optical Frequencies – 190

FRESH WATER

Fresh Water Content Variability in the Arctic Ocean – 82

FRICTION

Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

FUEL CELLS

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

FUEL INJECTION

Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

FUELS

Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

FULL SCALE TESTS

Design, Development and Testing of Airplanes for Mars Exploration – 7

FUNCTIONS (MATHEMATICS)

Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

FUNCTIONS

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

FURNACES

Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

GALACTIC CLUSTERS

Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Measuring the Mass Distribution in Z is Approximately 0.2 Cluster Lenses with XMM, HST and CFHT – 214

Over-Luminous Elliptical Galaxies – 210

GALACTIC EVOLUTION

Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

GALACTIC NUCLEI

Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

GALAXIES

Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

GALLIUM ANTIMONIDES

AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

GAMMA RAY BURSTS

An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Prompt GRB Optical Follow-up Experiments – 213

Super-LOTIS Early Time Optical Counterpart Measurements – 212

The Mystery of Gamma-Ray Bursts – 212

GAMMA RAY SPECTRA

Extensions of the Direct-Semidirect Model for Calculating the High Energy Component of Fast-Nucleon Induced Gamma Spectra – 184

GAMMA RAYS

Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Prompt GRB Optical Follow-up Experiments – 213

GAS CHROMATOGRAPHY

Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

GAS FLOW

Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

High Velocity Gas in the Line of Sight to the Vela SNR – 211

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

GAS IONIZATION

Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

GAS STREAMS

Stability of ClO2 as a Product of Gas Phase Decontamination Treatments – 38

GASEOUS FUELS

Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

GELATINS

Ballistic Impact of Braided Composites With a Soft Projectile – 62

GEMINI PROJECT

NOAO/NSO Newsletter – 218

GENE THERAPY

Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

GENERAL AVIATION AIRCRAFT

Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

GENES

Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Expression Profiling of Cell Lines Expressing Regulated NF2 Transcripts – 99

Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

GENETIC ALGORITHMS

Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Modeling of Low-Frequency Sound Propagation in the Baltic – 182

GENETIC ENGINEERING

Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95

GENETICS

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

GEODYNAMICS

Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74

GEOGRAPHIC INFORMATION SYSTEMS

A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

GEOLOGICAL SURVEYS

External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

GEOPHYSICS

Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry – 28

New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

GEOS 3 SATELLITE

Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

GERMANY

International Conference on Phenomena in Ionized Gases (26th) Held in Greifswald, Germany on 15-20 July 2003. Proceedings, Volume 4 – 196

GLACIERS

Greenland Glacier Albedo Variability – 81

GLASS TRANSITION TEMPERATURE

Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

GLASS

Batch Preheat for Glass and Related Furnace Processing Operations – 37

Sound Speeds of Post-Failure Wave Glass – 37

GLOBAL POSITIONING SYSTEM

Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

GLOBULAR CLUSTERS

Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

GLUTAMATES

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

GLUTAMINE

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

GRAIN BOUNDARIES

Connectivity in Random Grain Boundary Networks – 33

GRAMMARS

Science and Technology Text Mining: Nonlinear Dynamics – 203

GRAPH THEORY

Bipartite Graph Partitioning and Data Clustering – 149

GRAPHICAL USER INTERFACE

A Study on Visual Search and Selection of Pull-down Menu – 83

SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

GRAVITATIONAL EFFECTS

Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

GRAVITATIONAL FIELDS

Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

GRAVITATIONAL LENSES

Measuring the Mass Distribution in Z is Approximately 0.2 Cluster Lenses with XMM, HST and CFHT – 214

GREAT PLAINS CORRIDOR (NORTH AMERICA)

The Development of a Backfill Analysis Tool in the Army's Great Plains Regional Medical Command – 131

GREENLAND

Greenland Glacier Albedo Variability – 81

GRID GENERATION (MATHEMATICS)

Surface Generation and Cartesian Mesh Support – 160

GROUND STATE

Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

GROWTH

CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

GUANINES

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

GUANOSINES

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

HADRONS

Hadronic Multi-Particle Final State Measurements with CLAS at Jefferson Lab – 170

HAFNIUM COMPOUNDS

Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

HALOS

Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

HAMILTON-JACOBI EQUATION

Stochastic Optimal Control via Bellman's Principle – 164

HAZARDS

A Health Hazard Assessment for Blast Overpressure Exposures – 104

HEAD (ANATOMY)

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

HEALTH

A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital – 91

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97

A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135

A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

A Health Hazard Assessment for Blast Overpressure Exposures – 104

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer – 106

A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune – 104

A Study of Prescription Non-Compliance Womack Army Medical Center – 90

Adherence to Hypercholesterolemia Management Guidelines by Health Care Providers in a USA Air Force Medical Treatment Facility – 117

Alaska and the Alaska Federal Health Care Partnership – 88

An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center – 102

Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders – 92

Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes? – 89

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

Assessing the Value of Professional Coders in Ambulatory Healthcare Systems – 104

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Correlates for Utilization of Preventive Medicine Through the Use of Clinical Reminders at the Central Texas Veterans Health Care System – 129

Expert System Utilization for Behavioral Health – 125

Health Effects Support Document for Manganese (February 2003) – 27

Implementation of Provider Perspectives Resulted in Proper Health Care Resource Utilization – 100

Improving the Quality of Medical Coding Data at Naval Hospital Bremerton – 103

Measuring Cultural Change - A Management Focused Approach To Improving The Safety Culture – 112

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

Neurosurgical Provider Proficiency: Clairification of Readiness and Management Implications – 108

Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

Overseas Medical Screening – 103

Pharmacy Utilization: A Study to Predict BAMC Outpatient Pharmacy Usage by Dual-Eligible Military Retiree/Medicare-Eligible Beneficiaries Resulting From Implementation of the TRICARE Senior Pharmacy Program (TSRx) – 113

Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation – 130

Referral Process Improvement: A Study of the Efficiency and Tracking Processes for In-house Referrals at Blanchfield Army Community Hospital – 102

Science and Technology Transition Metrics – 112

Strategic Analysis and Plan for Implementing Telemedicine at Fort Greely – 131

Telemedicine Evaluation and Management of Lumbar Disk Herniation – 124

The Development of a Backfill Analysis Tool in the Army's Great Plains Regional Medical Command – 131

The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time – 101

The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

TRICARE Plus: A Cost, Capacity and Enrollment Analysis – 103

U.S. Army Nursing Readiness: A Field Administration of the Readiness Estimate and Deployability Index (READI) in the North Atlantic Regional Medical Command (NARMC) – 101

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam – 139

HEART DISEASES

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

HEART

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

HEAT FLUX

Ceramic Foams for TPS Applications – 15

HEAT MEASUREMENT

Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

HEAT SHIELDING

Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

HEAT TRANSFER

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces – 18

HEAVY IONS

Heavy-Ion Fusion Final Focus Magnet Shielding Designs – 194

Journal of Spacecraft Technology – 16

HELMETS

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Texas Children's Bicycle Helmet Bill Analysis – 147

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

HEMODYNAMIC RESPONSES

A Simulation Study on Cardiac Assist Device: Hemopump – 145

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

HERBICIDES

Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam – 139

HEURISTIC METHODS

An algorithm for the Asymmetric Traveling Salesman Problem – 168

HIGH ALTITUDE

Global Failure Modes in Composite Structures for High Altitudes – 24

HIGH REYNOLDS NUMBER

Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

HIGH SPEED CAMERAS

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

HIGH SPEED

High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

High Velocity Gas in the Line of Sight to the Vela SNR – 211

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

Jet Noise Modeling for Supersonic Business Jet Application – 9

HIGH STRENGTH STEELS

Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

HIGH TEMPERATURE GASES

The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

HIGH TEMPERATURE LUBRICANTS

Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

HIGH TEMPERATURE PLASMAS

Edge Plasma Analysis for Liquid-Wall MFE Concepts – 176

Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

HIGH TEMPERATURE

Development of Ceramic Matrix Composites For High Temperature Applications – 23

Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al – 34

High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

HIGH VOLTAGES

High Voltage Generation Research with the TTHPM System at FOI – 48

HIPPOCAMPUS

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

HISTOGRAMS

Approximate Splitting for Ensembles of Trees using Histograms – 152

HISTORIES

A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

HOMEOSTASIS

A Quantitative Study of Oxygen as a Metabolic Regulator – 84

HOSPITALS

A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital – 91

A Case Study of Job Satisfaction in Surgical Services at Martin Army Community Hospital – 123

A Comprehensive Study of the Incentive Award Program at General Leonard Wood Army Community Hospital – 166

A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135

A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune – 104

An Analysis of Emergency Department Overcrowding at The Johns Hopkins Hospital – 98

Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center – 127

Improving the Quality of Medical Coding Data at Naval Hospital Bremerton – 103

Innovation on a Hospital Perinatal Unit: Cell Phone Use by Nurses – 47

Optimization and Management of Naval Hospital Bremerton's Military-Medicare Population by Market Analysis of the Naval Hospital Bremerton Empanelled Population – 100

Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Referral Process Improvement: A Study of the Efficiency and Tracking Processes for In-house Referrals at Blanchfield Army Community Hospital – 102

Staying Prepared for the Joint Commission: Restructuring for Continuous Accreditation, Reynolds Army Community Hospital – 100

HOT PRESSING

Processing and Properties of HfB2 Based Materials – 29

HOT STARS

High Velocity Gas in the Line of Sight to the Vela SNR – 211

HOT SURFACES

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

HOT-WIRE ANEMOMETERS

Instrumentation for Wind Tunnel Transient Growth Studies – 4

HUMAN BEHAVIOR

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

HUMAN BEINGS

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

HUMAN BODY

Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

HUMAN CENTRIFUGES

Development and Application of Self-powered Short Arm Human Centrifuge – 141

+Gz Protection of a New Bladder Anti-G System – 140

HUMAN FACTORS ENGINEERING

A Study on Visual Search and Selection of Pull-down Menu – 83

HUMAN IMMUNODEFICIENCY VIRUS

Characterization and Enhanced Processing of Soluble, Oligomeric GP140 Envelope Glycoproteins Derived from Human Immunodeficiency Virus Type-1 Primary Isolates – 112

One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

HUMAN PERFORMANCE

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

HUMAN-COMPUTER INTERFACE

Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

HYBRID COMPOSITES

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

HYDRAZINES

Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

HYDROCARBONS

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

HYDRODYNAMICS

Dynamics of Droplet Collision and Flame Motion – 57

Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics – 56

HYDROGEN

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

Metallization of Hydrogen and Other Small Molecules at 100 GPa Pressures – 175

HYDROPONICS

An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake – 66

HYDROXYL COMPOUNDS

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

HYPERSONIC VEHICLES

Next Generation Spacecraft, Crew Exploration Vehicle – 12

HYPERTENSION

Adherence to Hypertension Management Recommendations for Patient Follow-Up Care and Lifestyle Modifications Made by Military Healthcare Providers – 126

Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

HYPERTHERMIA

Differences in the Onset and Severity of Symptoms of Malignant Hyperthermia With Different Inhalational Anesthetics – 136

ICE

Geophysics of Martian Periglacial Processes – 220

Ice Particle Impact on Cloud Water Content Instrumentation – 58

IGNITION

WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

ILLUMINATORS

Preliminary Radiation Shielding Design for BOOMERANG – 176

IMAGE ANALYSIS

Context Dependent Digital Image Shape Coding – 58

IMAGE PROCESSING

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

IMAGE RESOLUTION

Multiresolution Distance Volumes for Progressive Surface Compression – 152

IMAGERY

A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

IMAGING TECHNIQUES

Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Frequency-Dependent Time Lags in Three Blazars – 215

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

Proton MR Spectroscopic Imaging in NF-1 – 127

Review of the Communications Research Laboratory – 225

Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

Total Lightning Activity as Observed from Space – 80

IMMUNITY

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

IMMUNOLOGY

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

IMPACT ACCELERATION

Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

IMPACT FUSION

Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

IMPACT LOADS

Ballistic Impact of Braided Composites With a Soft Projectile – 62

IMPACT TESTS

Ballistic Impact of Braided Composites With a Soft Projectile – 62

IMPACT VELOCITY

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

IMPEDANCE MEASUREMENT

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

IMPELLERS

NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

IMPLANTED ELECTRODES (BIOLOGY)

Design and Implementation for the Prototype of a Microstimulator – 52

IMPULSES

Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

IMPURITIES

Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

IN SITU MEASUREMENT

Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

Understanding the Solar Sources of In Situ Observations – 226

IN VIVO METHODS AND TESTS

Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

INCENTIVES

A Comprehensive Study of the Incentive Award Program at General Leonard Wood Army Community Hospital – 166

INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY

Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

INEQUALITIES

Interior-Point l1-Penality Method for Nonlinear Optimization – 168

INERTIAL CONFINEMENT FUSION

Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

INFECTIOUS DISEASES

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

INFORMATION FLOW

The Information Flow in Network Based Defense – 43

INFORMATION MANAGEMENT

A One-Stop Web Application for the Mars Team – 200

INFORMATION RETRIEVAL

Intrusion Detection Using Data Mining Techniques – 60

Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

INFORMATION SYSTEMS

Feedback From Video From Virtual Reality Navigation – 154

Investigating Web Map Service Client Technologies – 202

INFORMATION TRANSFER

Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

INFRARED ASTRONOMY

Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

INFRARED RADIATION

Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Quantitative Infrared Reference Library. Library 2 – 204

INFRARED SIGNATURES

Large Amplitude Vibrational Influence on Electron Transfer Reactions – 60

INFRARED SPECTRA

Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions – 19

INHIBITORS

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

INJURIES

Biomechanics of Occupational Shoulder Injuries, Final Performance Report – 146

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Mitochondrial Mechanisms of Neuronal Injury – 106

Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

INLET NOZZLES

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

INLET TEMPERATURE

[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

INSECTS

Biological and Silicon Modeling of Moving Target Detection in Insects – 59

INSPECTION

Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

INSTALLING

Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

INSURANCE (CONTRACTS)

A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97

INTEGRATED CIRCUITS

Helsinki University of Technology Deparment of Electrical and Communications Engineering, Electron Physics Laboratory Annual Report 2001 – 171

Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

INTEGRATED OPTICS

Optical Architectures for Signal Processing – 187

INTELLIGENCE

High Voltage Generation Research with the TTHPM System at FOI – 48

National Institute of Justice Center Requirements Definition, Technical Assistance, Agile Test and Evaluation and Cyber Science Analysis – 159

USA Patriot Act Sunset: Provisions that Expire on December 31, 2005 – 46

INTERFEROMETERS

Preparations for EUV Interferometry of the 0.3 NA MET Optic – 189

Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

INTERNAL PRESSURE

Pressurization Analysis of Containers in the SAFKEG 3940A Package in KAMS (U) – 227

INTERNATIONAL SPACE STATION

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

INTERNETS

Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA – 204

First International Mobile IPR Workshop. Rights Management of Information Products on the Mobile Internet held August 27-28, 2003, Helsinki, Finland – 44

Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design – 14

INTERPLANETARY MAGNETIC FIELDS

Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

INTERPLANETARY MEDIUM

Interpretive Tools for Analysis of Coronal Images – 222

Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

INTERPLANETARY SPACECRAFT

Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

INTERPOLATION

LEOS Interpolation Package – 174

INTERSTELLAR CHEMISTRY
Exotic Molecules in Space: A Coordinated Astronomical Laboratory and Theoretical Study – 214

INTERSTELLAR MATTER
Exotic Molecules in Space: A Coordinated Astronomical Laboratory and Theoretical Study – 214

INTRAVENOUS PROCEDURES
Blood Sample Reliability Using Infusing Intravenous Lines – 129

INTRUSION DETECTION (COMPUTERS)
Performance of Neural Networks Methods in Intrusion Detection – 161

INVERSIONS
Saturated Output Tabletop X-ray Lasers – 189

INVESTIGATION
Federal Law Enforcement: Information on Use of Investigation and Arrest Statistics – 167

ION BEAMS
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

ION CHANNELS (BIOLOGY)
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

ION CYCLOTRON RADIATION
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

ION INJECTION
A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

ION TRAPS (INSTRUMENTATION)
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 211

IONIZATION
Neutrino Factory R&D in the U.S – 171

IONIZED GASES
Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases – 174

International Conference on Phenomena in Ionized Gases (26th) Held in Greifswald, Germany on 15-20 July 2003. Proceedings, Volume 4 – 196

The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

IONOSPHERES
New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

IO
The Composition and Physical Structure of the Io Torus and Atmosphere – 222

IRAQ
A CBO PAPER: Paying for Iraq'a Reconstruction – 65

IRON ALUMINIDES
Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al – 34

IRON OXIDES
Properties of the Hermean Regolith – 220

IRON
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

IRRADIATION
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

IRRIGATION
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

ISCHEMIA
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

ISOLATION
Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

ITERATION
Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms – 150

JAPAN
Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

JET AIRCRAFT NOISE
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Jet Noise Modeling for Supersonic Business Jet Application – 9

JUNCTION DIODES
P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

KINETIC ENERGY
Ballistic Impact of Braided Composites With a Soft Projectile – 62

KINETICS
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

Optimization of Off-Axis ICOS and Applications to Flow Tube Kinetics – 196

KNOWLEDGE BASED SYSTEMS
Phase II-SOF Knowledge Coupler-Based Phase I XML Schema – 116

KUIPER BELT
RTO Technical Publications: A Quarterly Listing – 228

LACTATES
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

LAGRANGIAN FUNCTION
Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws – 148

LSPRAY-II: A Lagrangian Spray Module – 158

Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics – 56

LAMINAR FLOW
RTO Technical Publications: A Quarterly Listing – 228

LAMINATES
Characteristic Matrices for Spherical Shell Photonic Systems – 188

LANDING LOADS
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

LANGUAGE PROGRAMMING
Match-bounded String Rewriting Systems – 155

LASER APPLICATIONS
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

LASER BEAMS
Corneal Damage From Mid-Infrared Laser Radiation – 105

Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

LASER DAMAGE
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

LASER TARGETS
Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

Multi-Kilovolt X-Ray Conversion Efficiencies – 186

LASER-INDUCED BREAKDOWN SPECTROSCOPY
Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals – 180

LATE STARS
An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

LATTICES (MATHEMATICS)
Lattice Based Coding Schemes – 169

LAUNCH VEHICLE CONFIGURATIONS
Next Generation Spacecraft, Crew Exploration Vehicle – 12

LAW (JURISPRUDENCE)
Federal Law Enforcement: Information on Use of Investigation and Arrest Statistics – 167

The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

USA Patriot Act Sunset: Provisions that Expire on December 31, 2005 – 46

LAYOUTS
NLC Interaction Region Layout and Background Estimates – 179

LEADERSHIP
A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

LEADING EDGES
Ceramic Foams for TPS Applications – 15

Wing Leading Edge Debris Analysis – 7

LEAST SQUARES METHOD
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods – 166

LEVITATION
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

LIBRARIES
Quantitative Infrared Reference Library. Library 2 – 204

LIFE CYCLE COSTS
Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

LIFE (DURABILITY)
Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

Self-Sustaining Robotic Ecologies and Space Architecture – 162

SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

LIFE SUPPORT SYSTEMS
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

LIGHT CURVE
Prompt GRB Optical Follow-up Experiments – 213

Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

LIGHT EMISSION
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

LIGHT EMITTING DIODES
LED Headlamps: Glare and Color Rendering – 146

LIGHT GAS GUNS
Metallization of Hydrogen and Other Small Molecules at 100 GPa Pressures – 175

LIGHT (VISIBLE RADIATION)
Space Weathering: An Ultraviolet Indicator – 217

LIGHTNING
Global Lightning Activity – 79

Total Lightning Activity as Observed from Space – 80

LINE OF SIGHT
A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

High Velocity Gas in the Line of Sight to the Vela SNR – 211

LINE SPECTRA
Completeness Criterion in Atomic Modeling – 179

LINEARITY
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

LINGUISTICS
A Review of Narrative Methodology – 155

LININGS
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

LIPIDS
Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

LIQUID FLOW
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

LIQUID FUELS
Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

LIQUID INJECTION
Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

LIQUID LEVELS
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

LIQUID PHASES
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

LIQUID ROCKET PROPELLANTS
Dynamics of Droplet Collision and Flame Motion – 57

LIQUID-SOLID INTERFACES
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

LITHIUM FLUORIDES
Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

LITHIUM
Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

LOADS (FORCES)
Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

LOCOMOTION
Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility – 87

LOGIC PROGRAMMING
Rapid Prototyping in PVS – 155

LOGISTICS
The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

LOOPS
Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

LORENTZ FORCE
Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment – 164

LOSSES
Static Analysis of C Programs – 164

LOW EARTH ORBITS
Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design – 14

LOW FREQUENCIES
Modeling of Low-Frequency Sound Propagation in the Baltic – 182

LUMBAR REGION
Telemedicine Evaluation and Management of Lumbar Disk Herniation – 124

LUMINOSITY
Over-Luminous Elliptical Galaxies – 210

LUNAR BASES
Lunar and Planetary Bases, Habitats, and Colonies – 11

LUNAR EXPLORATION
Apollo 13 - Press Kit – 222

Apollo 14 - Press Kit – 222

Roving Vehicles for Lunar and Planetary Exploration – 11

Space Weathering: An Ultraviolet Indicator – 217

LUNAR MINING
Recovery and Utilization of Extraterrestrial Resources – 216

LUNAR PROSPECTOR
A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

LUNAR ROVING VEHICLES
Roving Vehicles for Lunar and Planetary Exploration – 11

LUNAR SOIL
Properties of the Hermean Regolith – 220

LUNAR TRAJECTORIES
Apollo 13 - Press Kit – 222

LUNGS
Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer – 97

LYMPHOCYTES
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes – 115

MAGNESIUM ALLOYS
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

MAGNESIUM ISOTOPES
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

MAGNESIUM OXIDES
A Double-Blind Randomized Placebo Controlled Trial of Magnesium Oxide for Alleviation of Chronic Low Back Pain – 137

MAGNETIC BEARINGS
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

MAGNETIC CLOUDS
Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

MAGNETIC COOLING
Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

MAGNETIC FIELD CONFIGURATIONS
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Interpretive Tools for Analysis of Coronal Images – 222

MAGNETIC FIELD RECONNECTION
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

MAGNETIC FIELDS
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment – 164

Understanding the Solar Sources of In Situ Observations – 226

MAGNETIC MOMENTS
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

MAGNETIC RESONANCE
Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

Proton MR Spectroscopic Imaging in NF-1 – 127

MAGNETIC SIGNATURES
A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

Forecasting Coronal Mass Ejections from Magnetograms – 225

MAGNETIC STORMS
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

MAGNETOHYDRODYNAMIC FLOW
High Order Filter Methods for Shock/Turbulence MHD Flows – 53

MAGNETOHYDRODYNAMIC STABILITY
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

MAGNETOHYDRODYNAMIC WAVES
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

MAGNETOHYDRODYNAMICS
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

A Search for the Solar Sources of High-Speed Streams – 223

Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

MAGNETOSPHERE-IONOSPHERE COUPLING
Solar Wind/Magnetosphere/Ionosphere Coupling and the Temporal and Spatial Evolution of Boundary Layers using Cluster, Polar and other ISTP Satellites – 75

MAGNETOSPHERES
A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

MAGNETS
Heavy-Ion Fusion Final Focus Magnet Shielding Designs – 194

MAINTAINABILITY
Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

MAINTENANCE
Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

Repair of Damaged Concrete Structures Using Prepreg Composites – 24

The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

MALES

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

MAMMALS

High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

MAMMARY GLANDS

A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer – 106

Activation of ATM by DNA Damaging Agents – 124

Analysis of AND-34, A Novel p130Cas-Binding GDP Exchange Factor Implicated in the Development of Tamoxifen Resistance in Human Breast Cancer – 111

Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer – 123

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Enhancing the Effectiveness of Breast Cancer Immunotherapy Through Manipulation of the T Cell Cytoskeleton – 113

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials – 111

Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

Mammary Stromal Effects on Epithelial Differentiation and Expression of ESX and ErbB2 (HER2/neu) – 114

Peripheral Benzodiazepine Receptor (PBR) in Human Breast Cancer – 94

Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy – 96

Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility – 87

Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

Targeting Breast Cancer With Anti HER2/neu Diabodies – 105

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

MANAGEMENT INFORMATION SYSTEMS

Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

MANAGEMENT PLANNING

A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital – 91

A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune – 104

A Study of Prescription Non-Compliance Womack Army Medical Center – 90

Alaska and the Alaska Federal Health Care Partnership – 88

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center – 102

Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders – 92

Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes? – 89

Assessing the Value of Professional Coders in Ambulatory Healthcare Systems – 104

Implementation of Provider Perspectives Resulted in Proper Health Care Resource Utilization – 100

Improving the Quality of Medical Coding Data at Naval Hospital Bremerton – 103

Materials Science Work at NASA Ames Research Center – 30

Measuring Cultural Change - A Management Focused Approach To Improving The Safety Culture – 112

Neurosurgical Provider Proficiency: Clairification of Readiness and Management Implications – 108

Overseas Medical Screening – 103

Pharmacy Utilization: A Study to Predict BAMC Outpatient Pharmacy Usage by Dual-Eligible Military Retiree/Medicare-Eligible Beneficiaries Resulting From Implementation of the TRICARE Senior Pharmacy Program (TSRx) – 113

Referral Process Improvement: A Study of the Efficiency and Tracking Processes for In-house Referrals at Blanchfield Army Community Hospital – 102

The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time – 101

The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

TRICARE Plus: A Cost, Capacity and Enrollment Analysis – 103

U.S. Army Nursing Readiness: A Field Administration of the Readiness Estimate and Deployability Index (READI) in the North Atlantic Regional Medical Command (NARMC) – 101

MANAGEMENT SYSTEMS

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

MANGANESE ALLOYS

Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al – 34

MANGANESE

Health Effects Support Document for Manganese (February 2003) – 27

MANNED SPACE FLIGHT NETWORK

Apollo 7 - Press Kit – 16

MANUAL CONTROL

Development and Application of Self-powered Short Arm Human Centrifuge – 141

MANUALS

User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

MANUFACTURING

Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA – 204

MAPPING

A Search for the Solar Sources of High-Speed Streams – 223

MARANGONI CONVECTION

Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

MARKERS

A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

MARKING

Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

MARS BASES

Lunar and Planetary Bases, Habitats, and Colonies – 11

MARS EXPLORATION

A One-Stop Web Application for the Mars Team – 200

Design, Development and Testing of Airplanes for Mars Exploration – 7

Roving Vehicles for Lunar and Planetary Exploration – 11

MARS LANDING SITES

Roving Vehicles for Lunar and Planetary Exploration – 11

System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

MARS MISSIONS

System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

MARS (PLANET)

The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

MARS ROVING VEHICLES

Roving Vehicles for Lunar and Planetary Exploration – 11

MARS SAMPLE RETURN MISSIONS

Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

MARS SURFACE

[Analysis of Observations from Mars Global Surveyor] – 219

Geophysics of Martian Periglacial Processes – 220

Getting the Most from the Twin Mars Rovers – 219

MASS DISTRIBUTION

Greenland Glacier Albedo Variability – 81

Measuring the Mass Distribution in Z is Approximately 0.2 Cluster Lenses with XMM, HST and CFHT – 214

MASS SPECTROMETERS

Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

MASS SPECTROSCOPY

Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

MASSIVELY PARALLEL PROCESSORS

New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002 – 154

MATERIALS RECOVERY

Recovery and Utilization of Extraterrestrial Resources – 216

MATERIALS SCIENCE

Microgravity Materials Research and Code U ISRU – 39

MATERIALS TESTS

Ablative Thermal Protection: An Overview – 35

Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Computational Simulations of High Intensity X-Ray Interaction – 20

MATHEMATICAL MODELS

A Simulation Study on Cardiac Assist Device: Hemopump – 145

Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations – 164

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Assessing Regression to the Mean and Intervention Effect – 42

Constitutive Modeling of Piezoelectric Polymer Composites – 36

Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws – 148

Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

Match-bounded String Rewriting Systems – 155

Modeling of Low-Frequency Sound Propagation in the Baltic – 182

Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

MATHEMATICS

Complementary Pairs of Multilinear Polynomials – 150

Weighted Bergman Spaces and the Integral Means Spectrum of Conformal Mappings – 148

MATRICES (MATHEMATICS)

Characteristic Matrices for Spherical Shell Photonic Systems – 188

MEASUREMENT

Hadronic Multi-Particle Final State Measurements with CLAS at Jefferson Lab – 170

MEASURING INSTRUMENTS

[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

MECHANICAL DRIVES

WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

MECHANICAL ENGINEERING

Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

Mechanical Engineering Safety Note - PEPC Spreader Bar Assembly – 185

MECHANICAL PROPERTIES

AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics – 49

Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Development of Ceramic Matrix Composites For High Temperature Applications – 23

MEDICAL EQUIPMENT

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

MEDICAL PERSONNEL

A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities – 134

A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War – 121

Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Innovation on a Hospital Perinatal Unit: Cell Phone Use by Nurses – 47

MEDICAL SCIENCE

A Health Hazard Assessment for Blast Overpressure Exposures – 104

Analysis of AND-34, A Novel p130Cas-Binding GDP Exchange Factor Implicated in the Development of Tamoxifen Resistance in Human Breast Cancer – 111

Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

MEDICAL SERVICES

A Case Study of Job Satisfaction in Surgical Services at Martin Army Community Hospital – 123

A Comparison of Diabetes Management in a Federal Prison with the National Standards of Care Published by the ADA in 1998 – 126

A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97

A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Adherence to Hypercholesterolemia Management Guidelines by Health Care Providers in a USA Air Force Medical Treatment Facility – 117

Adherence to Hypertension Management Recommendations for Patient Follow-Up Care and Lifestyle Modifications Made by Military Healthcare Providers – 126

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

An Analysis of Emergency Department Overcrowding at The Johns Hopkins Hospital – 98

Assessing the Value of Professional Coders in Ambulatory Healthcare Systems – 104

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center – 127

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics – 87

Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Nurse Practitioners' Experience With Herbal Therapy – 139

Optimization and Management of Naval Hospital Bremerton's Military-Medicare Population by Market Analysis of the Naval Hospital Bremerton Empanelled Population – 100

Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation – 130

Staying Prepared for the Joint Commission: Restructuring for Continuous Accreditation, Reynolds Army Community Hospital – 100

Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients – 107

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center – 98

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

MELTING

Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Greenland Glacier Albedo Variability – 81

MEMBRANES

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

MEMORY

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

MENTAL HEALTH

Proton MR Spectroscopic Imaging in NF-1 – 127

The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center – 98

MENTAL PERFORMANCE

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

MERCURY ATMOSPHERE

NOAO/NSO Newsletter – 218

MESH

Image-Driven Mesh Optimization – 149

METABOLIC DISEASES

A Comparison of Diabetes Management in a Federal Prison with the National Standards of Care Published by the ADA in 1998 – 126

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes – 115

METABOLISM

A Quantitative Study of Oxygen as a Metabolic Regulator – 84

Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

METABOLITES

A Quantitative Study of Oxygen as a Metabolic Regulator – 84

METAL MATRIX COMPOSITES

Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

METALLIC GLASSES

Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

METALLURGY

Seminar Course on Advanced Metallurgical Processes/2002 – 19

METALS

Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

Seminar Course on Advanced Metallurgical Processes/2002 – 19

METASTABLE STATE

Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

METASTASIS

Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

METEORITIC COMPOSITION

Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

METEOROLOGICAL PARAMETERS

[CO2 Budget and Atmospheric Rectification (COBRA) Over North America] – 78

Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

METHANE

[CO2 Budget and Atmospheric Rectification (COBRA) Over North America] – 78

Modeling of Microscale Variations in Methane Fluxes – 79

METHODOLOGY

Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

MICE

Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

MICROANALYSIS

Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals – 180

MICROBIOLOGY

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

MICROCHANNELS

Nanosecond Frame Cameras – 48

MICROELECTROMECHANICAL SYSTEMS

Advanced Adaptive Optics Technology Development – 189

Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

MICROELECTRONICS

Design and Implementation for the Prototype of a Microstimulator – 52

MICROGRAVITY

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

Microgravity Materials Research and Code U ISRU – 39

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

MICROORGANISMS

An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

MICROPHONES

Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

MICROSTRUCTURE

Connectivity in Random Grain Boundary Networks – 33

MICROWAVE EMISSION

Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

MICROWAVE EQUIPMENT

Microwave Photonics in Dual-Use Military Systems: A Personal Perspective – 44

Novel Microwave Photonic Techniques in the Future Military Systems – 187

Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

Optoelectronic Components and Integration Devices: From Concepts to Applications – 50

MICROWAVE FREQUENCIES

Optical Architectures for Signal Processing – 187

MICROWAVE TUBES

Microwave Chaotic Sources – 52

MICROWAVES

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

High Voltage Generation Research with the TTHPM System at FOI – 48

Opto-Microwave Signal Processing: Up and Down Conversion Techniques – 45

MILITARY OPERATIONS

A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War – 121

Analysis of the Military Effectiveness of Future C2 Concepts and Systems – 162

Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks – 41

Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center – 127

Communication Channel in Urban Operations: A First Survey – 42

Nurse Practitioners' Experience With Herbal Therapy – 139

Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

US National Security and Strategy. A Selected Bibliography – 204

MILITARY TECHNOLOGY

Microwave Photonics in Dual-Use Military Systems: A Personal Perspective – 44

MILLIMETER WAVES

Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

MINERALOGY

Properties of the Hermean Regolith – 220

MINERALS

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Mineral Commodity Summaries, 2004 – 20

Properties of the Hermean Regolith – 220

Recovery and Utilization of Extraterrestrial Resources – 216

MINES (EXCAVATIONS)

Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

MISSILE CONFIGURATIONS

Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

MISSILE TRACKING

SIM: The Satellite and Missile Mission Simulator – 12

MISSILES

Comparison between High Level Radiated Susceptibility Tests and Coupling Measurements – 49

MITOCHONDRIA

Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95

Mitochondrial Mechanisms of Neuronal Injury – 106

Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

MOBILE COMMUNICATION SYSTEMS

Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

MODELS

Constitutive Modeling of Piezoelectric Polymer Composites – 36

Control of Convection in Containerless Processing – 21

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Jet Noise Modeling for Supersonic Business Jet Application – 9

Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

MODULATION

Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

MOISTURE CONTENT

Ice Particle Impact on Cloud Water Content Instrumentation – 58

System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

MOISTURE

Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

Modeling of Microscale Variations in Methane Fluxes – 79

MOLECULAR BIOLOGY

Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

MOLECULAR DYNAMICS

Large Amplitude Vibrational Influence on Electron Transfer Reactions – 60

Simulation of Reaction Dynamics for Synthesis of Energetic Materials and Resistant Coatings – 21

MOLECULAR ELECTRONICS

Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

MOLECULAR GASES

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

MOLECULAR STRUCTURE

Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

MOLECULAR WEIGHT

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

MOMENTUM THEORY

Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases – 174

MONATOMIC GASES

Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases – 174

MONITORS

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

MONTE CARLO METHOD

Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture – 177

Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

MORPHOLOGY
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

MOUNTAINS
Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74

MULTIPROCESSING (COMPUTERS)
Characteristics of Workload on ASCI Blue-Pacific at Lawrence Livermore National Laboratory – 151

MUONS
Neutrino Factory R&D in the U.S – 171

MUSCLES
DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

MUSCULOSKELETAL SYSTEM
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142
Ergonomic Risk Factors and Cumulative Trauma Disorders – 146
Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

MUTATIONS
Activation of ATM by DNA Damaging Agents – 124
ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer – 123
Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

MYOCARDIUM
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

NANOCOMPOSITES
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35
Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

NANOCRYSTALS
Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions – 19

NANOPARTICLES
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

NANOSTRUCTURES (DEVICES)
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

NASA PROGRAMS
Centennial of Flight Educational Outreach – 227
Collaborative Engineering for Research and Development – 199
Collaborative Product Development in an R&D Environment – 200
Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67
Environmental Assessment for the NASA First Response Facility – 69
Microgravity Materials Research and Code U ISRU – 39

NASA SPACE PROGRAMS
Design, Development and Testing of Airplanes for Mars Exploration – 7
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15
Overviews of the Apollo Program and Its Management – 10

NAVIER-STOKES EQUATION
Accuracy of Projection Methods for the Imcompressible Navier-Stokes Equation – 55

NAVIGATION
Roving Vehicles for Lunar and Planetary Exploration – 11

NAVY
A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135
Review of Navy Program to Develop Optical Quality Diamond Windows and Domes – 198
Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits – 119

NEAR EARTH OBJECTS
Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

NEOPLASMS
Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95
NF1 Tumor Specific Therapeutic Modeling – 89
Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110
Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

NERVES
Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114
Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93
The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

NERVOUS SYSTEM
Mitochondrial Mechanisms of Neuronal Injury – 106
Proton MR Spectroscopic Imaging in NF-1 – 127
Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

NETWORK ANALYSIS
AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

NETWORK SYNTHESIS
Adding Assurance to Automatically Generated Code – 161

NETWORKS
Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147
Remote Operations in a Global Accelerator Network – 149

NEURAL NETS
A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162
Latched Recurrent Neural Network – 163
Performance of Neural Networks Methods in Intrusion Detection – 161

NEUROLOGY
Proton MR Spectroscopic Imaging in NF-1 – 127

NEUROMUSCULAR TRANSMISSION
Design and Implementation for the Prototype of a Microstimulator – 52

NEUROPHYSIOLOGY
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83
Mitochondrial Mechanisms of Neuronal Injury – 106

NEUTRAL ATMOSPHERES
Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

NEUTRINO BEAMS
Summary of Working Group 2 – 199

NEUTRINOS
Neutrino Factory R&D in the U.S – 171
Summary of Working Group 2 – 199

NEUTRON CROSS SECTIONS
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

NEUTRON EMISSION
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

NEUTRON STARS
Accreting Neutron Stars as Astrophysical Laboratories – 209

Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

NEUTRONS
Novel Parallel Numerical Methods for Radiation & Neutron Transport – 184

Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

NEWS MEDIA
Apollo 14 - Press Kit – 222

NICKEL ALLOYS
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

NIOBIUM COMPOUNDS
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

NITRATES
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

NITRITES
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

NITROGEN OXIDES
[CO2 Budget and Atmospheric Rectification (COBRA) Over North America] – 78

NOx, Fine Particle and Toxic Metal Emissions from the Combustion of Sewage Sludge/Coal Mixtures: A Systematic Assessment – 72

NITROGEN
Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

NOISE PREDICTION (AIRCRAFT)
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

NOISE PREDICTION
Jet Noise Modeling for Supersonic Business Jet Application – 9

NOISE REDUCTION
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Jet Noise Modeling for Supersonic Business Jet Application – 9

NTT Technical Review – 47

NOISE (SOUND)
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

NONDESTRUCTIVE TESTS
Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

NONINTRUSIVE MEASUREMENT
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

NONLINEAR PROGRAMMING
Interior-Point l1-Penality Method for Nonlinear Optimization – 168

NONLINEAR SYSTEMS
Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Stochastic Optimal Control via Bellman's Principle – 164

NONLINEARITY
Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Science and Technology Text Mining: Nonlinear Dynamics – 203

NORMALIZED DIFFERENCE VEGETATION INDEX
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

NOSES (FOREBODIES)
Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

NOZZLE DESIGN
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

NOZZLES
Ablative Thermal Protection: An Overview – 35

NUCLEAR FUSION
Edge Plasma Analysis for Liquid-Wall MFE Concepts – 176

Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

NUCLEAR PHYSICS
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

NUCLEAR POWER PLANTS
Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

NUCLEAR REACTORS
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

NUCLEATION
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

NUCLEON-NUCLEON INTERACTIONS
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

NUCLEONS
Extensions of the Direct-Semidirect Model for Calculating the High Energy Component of Fast-Nucleon Induced Gamma Spectra – 184

NUMERICAL ANALYSIS
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Stochastic Optimal Control via Bellman's Principle – 164

Stopping Citerion for the Conjugate Gradient Algorithm in a Finite Element Method Framework – 148

Why are the P(n) and S(n) Methods Equivalent – 175

NUMERICAL WEATHER FORECASTING
Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

NUTRITION
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

O RING SEALS
Performance Evaluation of O-Rings in the SAFKEG 3940A Package in KAMS (U) – 227

OBSERVATION
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

OBSERVATORIES
The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR) – 60

OCCLUSION
Time-Sharing of a Visual In-Vehicle Task While Driving: Finding from the Task Occlusion Method – 146

OCEAN MODELS
Fresh Water Content Variability in the Arctic Ocean – 82

OLIGOMERS
Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

ONCOGENES
Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

OPERATING SYSTEMS (COMPUTERS)
A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

OPTICAL COMMUNICATION
Fiber Optic Distribution Networks for Military Applications – 45

Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Novel Microwave Photonic Techniques in the Future Military Systems – 187

Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Opto-Microwave Signal Processing: Up and Down Conversion Techniques – 45

Super-LOTIS Early Time Optical Counterpart Measurements – 212

Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems – 44

OPTICAL CONTROL
Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

OPTICAL FIBERS
Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

OPTICAL MATERIALS
Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

OPTICAL MEASUREMENT
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

RTO Technical Publications: A Quarterly Listing – 228

OPTICAL RESONATORS
Coherence Phenomena in Coupled Optical Resonators – 190

P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

OPTIMAL CONTROL
Stochastic Optimal Control via Bellman's Principle – 164

OPTIMIZATION
Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

Image-Driven Mesh Optimization – 149

Interior-Point l1-Penality Method for Nonlinear Optimization – 168

Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

Video Object Shape Coding Using Control Point Optimization – 59

OPTOELECTRONIC DEVICES
Optical Processing of Microwave Signals – 50

Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

Optoelectronic Components and Integration Devices: From Concepts to Applications – 50

ORGANIZATIONS
A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97

ORGANOMETALLIC COMPOUNDS
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

OROGRAPHY
Total Lightning Activity as Observed from Space – 81

OSCILLATIONS
Accreting Neutron Stars as Astrophysical Laboratories – 209

Fresh Water Content Variability in the Arctic Ocean – 82

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Summary of Working Group 2 – 199

OUTER PLANETS EXPLORERS
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

OVARIES
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

OVERPRESSURE
A Health Hazard Assessment for Blast Overpressure Exposures – 104

OXIDATION
Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

OXYGEN PRODUCTION
Recovery and Utilization of Extraterrestrial Resources – 216

OXYGENATION
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

OXYGEN
Modeling of Microscale Variations in Methane Fluxes – 79

OZONE
Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

PAIN
A Double-Blind Randomized Placebo Controlled Trial of Magnesium Oxide for Alleviation of Chronic Low Back Pain – 137

PARALLEL COMPUTERS
hypre: A Library of High Performance Preconditioners – 153

PARALLEL PROCESSING (COMPUTERS)
hypre: A Library of High Performance Preconditioners – 153

TIGER LDRD – 170

PARAMETERIZATION
Multiresolution Distance Volumes for Progressive Surface Compression – 152

Validation of an Urban Parameterization in a Mesoscale Model – 150

PARTICLE ACCELERATORS
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

Search for New Particles at CDF II – 178

Search for New Phenomena in CDF – 178

PARTICLE SPIN
Baryon Operators and Spectroscopy in Lattice QCD – 170

PARTICLES
Hadronic Multi-Particle Final State Measurements with CLAS at Jefferson Lab – 170

PARTICULATES
Reducing Indoor Residential Exposures to Outdoor Pollutants – 69

PARTITIONS (MATHEMATICS)

Bipartite Graph Partitioning and Data Clustering – 149

PATHOGENESIS

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment – 91

PATIENTS

A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

Adherence to Hypertension Management Recommendations for Patient Follow-Up Care and Lifestyle Modifications Made by Military Healthcare Providers – 126

Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders – 92

Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes? – 89

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients – 107

PATTERN RECOGNITION

Context Dependent Digital Image Shape Coding – 58

PAVEMENTS

Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

PAYLOAD INTEGRATION

Space-based Science Operations Grid Prototype – 158

PAYLOADS

National Aeronautics and Space Administration STS-1 First Space Shuttle Mission Press Kit – 16

Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

PEAT

Modeling of Microscale Variations in Methane Fluxes – 79

PEPTIDES

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

PERCEPTION

Effects of Stress and Relaxation on Time Perception – 139

PERFORMANCE PREDICTION

Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

PERFORMANCE TESTS

Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

ASCI PSE Milepost: Run-Time Systems Performance Tests – 156

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Materials Science Work at NASA Ames Research Center – 30

NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

Performance Evaluation of O-Rings in the SAFKEG 3940A Package in KAMS (U) – 227

PERFORMANCE

Performance of Neural Networks Methods in Intrusion Detection – 161

PERSONNEL

A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities – 134

A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Effects of Pregnancy on the Army Physical Fitness Test – 125

Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel – 107

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

Officer Street-to-Fleet Database: Expanding Capabilities – 205

One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center – 98

Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam – 139

PETN

Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

PETROLEUM PRODUCTS

Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

PHARMACOLOGY

A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune – 104

Pharmacy Utilization: A Study to Predict BAMC Outpatient Pharmacy Usage by Dual-Eligible Military Retiree/Medicare-Eligible Beneficiaries Resulting From Implementation of the TRICARE Senior Pharmacy Program (TSRx) – 113

PHASE DIAGRAMS

Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

PHASE TRANSFORMATIONS

AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics – 49

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

PHASE VELOCITY

Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

PHASED ARRAYS

Multibeam Phased Array Antennas – 191

PHOSPHORUS

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

PHOTOELECTRON SPECTROSCOPY

Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

PHOTOELECTRONS

Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

PHOTOGRAPHIC EQUIPMENT

Apollo 7 - Press Kit – 16

PHOTOIONIZATION

Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

PHOTOLUMINESCENCE

Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

PHOTOMETRY

Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

Systematic Effects in Color Photometry Data – 13

PHOTONICS

Characteristic Matrices for Spherical Shell Photonic Systems – 188

Coherence Phenomena in Coupled Optical Resonators – 190

Microwave Photonics in Dual-Use Military Systems: A Personal Perspective – 44

Novel Microwave Photonic Techniques in the Future Military Systems – 187

Optics Microwave Interactions – 187

Optoelectronic Components and Integration Devices: From Concepts to Applications – 50

RF Photonics for Beamforming and Array Applications – 188

PHOTONS

Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

PHOTORECEPTORS

Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

PHOTOSYNTHETICALLY ACTIVE RADIATION

Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

PHOTOVOLTAIC CONVERSION

Learning by Doing: The Evolution of State Support for Photovoltaics – 68

PHYSICAL EXERCISE

Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

PHYSICAL FITNESS

Effects of Pregnancy on the Army Physical Fitness Test – 125

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

PHYSICIANS

Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War – 121

PHYSIOLOGICAL EFFECTS

Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

PHYSIOLOGICAL RESPONSES

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

PHYSIOLOGY

Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

PIEZOELECTRICITY

Constitutive Modeling of Piezoelectric Polymer Composites – 36

Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

PILOT INDUCED OSCILLATION

An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

PILOT TRAINING

The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

PILOTLESS AIRCRAFT

Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

PITUITARY HORMONES

Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy – 96

PLANETS

Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

PLASMA CONTROL

Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties – 191

PLASMA DECAY

Spheromak Formation Studies in SSPX – 192

PLASMA DENSITY

Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

PLASMA DIAGNOSTICS

Plasma Diagnostics in High-Resolution X-ray Spectra of Magnetic Cataclysmic Variables – 195

PLASMA DRIFT

Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

PLASMA ENGINES

Transport in Plasma Thrusters Using Complex Propellants – 17

PLASMA GENERATORS

Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

PLASMA TURBULENCE

Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties – 191

PLASMAS (PHYSICS)

A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

Modeling of Short-Pulse-Driven Nickel-like X-Ray Laser and Recent Experiments – 189

New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

Optimization of Off-Axis ICOS and Applications to Flow Tube Kinetics – 196

Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

Turbulence Simulations of X-point Physics on the L-H Transitions – 192

PLASTIC PROPERTIES

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

PLASTICS

Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

PLATINUM

Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

PLUTONIUM ISOTOPES

Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

PLUTONIUM

Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs – 36

P-N JUNCTIONS

P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

POLAR CAPS

Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

POLAR REGIONS

A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

Forecasting Coronal Mass Ejections from Magnetograms – 225

POLAR WANDERING (GEOLOGY)

Earth System Dynamics: The Determination and Interpretation of the Global Angular Momentum Budget using the Earth Observing System – 77

POLARITY

Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility – 87

POLARIZATION (CHARGE SEPARATION)

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

POLICIES

Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress – 162

The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

POLLUTION

Reducing Indoor Residential Exposures to Outdoor Pollutants – 69

POLYETHYLENES

Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

POLYHEDRONS

Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

POLYMERS

Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

POLYMORPHISM

Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95

POLYNOMIALS

Complementary Pairs of Multilinear Polynomials – 150

POLYNYAS

Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

POLYSTYRENE

Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

POPULATIONS

Optimization and Management of Naval Hospital Bremerton's Military-Medicare Population by Market Analysis of the Naval Hospital Bremerton Empanelled Population – 100

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

POSITION (LOCATION)

Columbia Shuttle Recovery Operations, April 1, 2003 – 14

Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

POSITIONING

PEPC LRU: Ball Support Assembly – 186

POWER LINES

Skin Effect Impact on Current Density Distibution in OPGW Cables – 49

POWER SUPPLIES

Lunar and Planetary Bases, Habitats, and Colonies – 11

PREDICTION ANALYSIS TECHNIQUES

Validation of an Urban Parameterization in a Mesoscale Model – 150

PREDICTIONS

Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders – 92

Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes? – 89

Schedule Risk Assessment – 169

PREGNANCY

Effects of Pregnancy on the Army Physical Fitness Test – 125

Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

PRESSURE BREATHING

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

PRESSURE GRADIENTS

Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

PRESSURE MEASUREMENT

NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

PRESSURE SENSITIVE PAINTS

Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

PRESSURE SENSORS

Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

PRESSURE SUITS

Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

PREVENTION

Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes – 115

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

PRIVACY

The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

PROBABILITY THEORY

Overview of Future of Probabilistic Methods and RMSL Technology and the Probabilistic Methods Education Initiative for the US Army at the SAE G-11 Meeting – 202

PROBES

Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

PROBLEM SOLVING

Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

PROCEDURES

Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

PRODUCT DEVELOPMENT

Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

Development of Ceramic Matrix Composites For High Temperature Applications – 23

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

PRODUCTIVITY

A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

PROGRAM VERIFICATION (COMPUTERS)

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

PROGRAMMING ENVIRONMENTS

Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

PROJECT MANAGEMENT

Collaborative Product Development in an R&D Environment – 200

Overviews of the Apollo Program and Its Management – 10

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

PROJECT PLANNING

Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

PROPAGATION VELOCITY

Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

PROPELLANT TANKS

Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

PROPELLANTS

Transport in Plasma Thrusters Using Complex Propellants – 17

PROPULSION SYSTEM CONFIGURATIONS

Challenges and Experiences with Electric Propulsion Transit Buses in the USA – 72

PROPULSION SYSTEM PERFORMANCE

Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

Challenges and Experiences with Electric Propulsion Transit Buses in the USA – 72

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

PROSTATE GLAND

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

The Effect of Prostate Cancer Support Groups on Uncertainty – 138

PROTEINS

Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Characterization and Enhanced Processing of Soluble, Oligomeric GP140 Envelope Glycoproteins Derived from Human Immunodeficiency Virus Type-1 Primary Isolates – 112

Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

PROTOCOL (COMPUTERS)

Load Balancing by MPLS in Differentiated Services Networks – 43

Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design – 14

Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147

Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

PROTONS

Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Proton MR Spectroscopic Imaging in NF-1 – 127

PROTOTYPES

AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Design and Implementation for the Prototype of a Microstimulator – 52

PEPC LRU: Ball Support Assembly – 186

Space-based Science Operations Grid Prototype – 158

PSYCHOLOGY

Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

Correlates for Utilization of Preventive Medicine Through the Use of Clinical Reminders at the Central Texas Veterans Health Care System – 129

My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

PSYCHOMOTOR PERFORMANCE

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

PUBLIC HEALTH

Environmental Assessment for the NASA First Response Facility – 69

PULSARS

Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

PULSE COMMUNICATION

Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach – 41

PULSE DURATION

Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

PULSED LASERS

Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

PUMPS

Development of a Valve-Less Meso-Scale Pump – 63

PUNCHED CARDS

Development of Data Acquisition Card in Exercise-ECG Detection System – 144

PYROLYSIS

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

PYRUVATES

Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

QUADRUPOLES

NLC Interaction Region Layout and Background Estimates – 179

QUASARS

Low-mass X-ray Binaries with RXTE – 211

QUENCHING (COOLING)

Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

RACES (ANTHROPOLOGY)

My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

RADIATION COUNTERS

Summary of Working Group 2 – 199

RADIATION DISTRIBUTION

Radiological Considerations for Top-Up Operation of the Storage Ring – 227

RADIATION MEASUREMENT

Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

RADIATION PRESSURE

Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

RADIATION SOURCES

Microwave Chaotic Sources – 52

RADIATION THERAPY

ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer – 123

RADIATIVE TRANSFER

Physical Basis for the Maximum Thermal Radiation Emisssion between Materials – 190

RADICALS

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

RADIO EQUIPMENT

Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems – 44

RADIO FREQUENCIES

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

RF Photonics for Beamforming and Array Applications – 188

RADIO GALAXIES

Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

RADIOACTIVE ISOTOPES

Evaluation of Proposed New LLW Disposal Activity: Disposal of Aqueous PUREX Waste Stream in the Saltstone Disposal Facility – 71

Targeting Breast Cancer With Anti HER2/neu Diabodies – 105

RADIOACTIVE WASTES

Evaluation of Proposed New LLW Disposal Activity: Disposal of Aqueous PUREX Waste Stream in the Saltstone Disposal Facility – 71

Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs – 36

RADIOGRAPHY

Composite Target Concept for Multi-Pulse Radiography – 172

RADIOLOGY

Radiological Considerations for Top-Up Operation of the Storage Ring – 227

RAPID PROTOTYPING

Rapid Prototyping in PVS – 155

RATINGS

An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

RATS

Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

REACTING FLOW

Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

REACTION KINETICS

Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

REACTION TIME

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

REACTIVITY

Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

REACTOR SAFETY

Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

READING

Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

REAL TIME OPERATION

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

Feedback From Video From Virtual Reality Navigation – 154

RECEPTORS (PHYSIOLOGY)

Kainate Receptors in the Striatum: Implications for Excitotoxicity in Huntington's Disease – 108

Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

RECONFIGURABLE HARDWARE

Applying a Genetic Algorithm to Reconfigurable Hardware – 165

RECYCLING

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

REENTRY EFFECTS

Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

REFINING

Seminar Course on Advanced Metallurgical Processes/2002 – 19

REGOLITH

Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Properties of the Hermean Regolith – 220

REGULATIONS

First International Mobile IPR Workshop. Rights Management of Information Products on the Mobile Internet held August 27-28, 2003, Helsinki, Finland – 44

REGULATORS

A Quantitative Study of Oxygen as a Metabolic Regulator – 84

RELAXATION (PHYSIOLOGY)

Effects of Stress and Relaxation on Time Perception – 139

RELIABILITY ANALYSIS

Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

RELIABILITY

Blood Sample Reliability Using Infusing Intravenous Lines – 129

Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

REMOTE SENSING

Brillouin Spectroscopy Data Base for Biological Threats – 205

Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

Journal of Spacecraft Technology – 16

Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Properties of the Hermean Regolith – 220

Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

RENEWABLE ENERGY

Learning by Doing: The Evolution of State Support for Photovoltaics – 68

REPORTS

NASA Langley Scientific and Technical Information Output-2002 – 201

RESEARCH AND DEVELOPMENT

Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Batch Preheat for Glass and Related Furnace Processing Operations – 37

Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

Microgravity Materials Research and Code U ISRU – 39

Neutrino Factory R&D in the U.S – 171

Science and Technology Text Mining: Nonlinear Dynamics – 203

Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

Science and Technology Transition Metrics – 112

RESEARCH MANAGEMENT

Science and Technology Transition Metrics – 112

RESEARCH

A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts – 206

RESIDUAL STRENGTH

SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

RESIDUAL STRESS

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

RESISTORS

Ti-Cr-Al-O Thin Film Resistors – 37

RESONANT FREQUENCIES

Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

RESOURCES MANAGEMENT

A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

Characteristics of Workload on ASCI Blue-Pacific at Lawrence Livermore National Laboratory – 151

RETINA

Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

REUSABLE LAUNCH VEHICLES

Next Generation Spacecraft, Crew Exploration Vehicle – 12

REVERBERATION

Investigation of the Electromagnetic Field Distribution in an Undermoded Reverberation Chamber – 48

RIBOSE

Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

RING CURRENTS

Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

RISK

Health Effects Support Document for Manganese (February 2003) – 27

Ovarian Cancer Risk and Survival in BRCA 1/2 Carriers – 93

Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer – 97

Schedule Risk Assessment – 169

ROBOTICS

Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Lunar and Planetary Bases, Habitats, and Colonies – 11

Self-Sustaining Robotic Ecologies and Space Architecture – 162

ROOFS

Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

ROTATION

Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

ROTORS

High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

ROUTES

Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

ROVING VEHICLES
Getting the Most from the Twin Mars Rovers – 219

RUPTURING
SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

SAFETY FACTORS
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

Switchyard Enclosure Bolted Connection Calculations – 169

SAFETY MANAGEMENT
Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

SAFETY
Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations – 164

Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Measuring Cultural Change - A Management Focused Approach To Improving The Safety Culture – 112

NIF PEPC Mechanical Test Stand Safety Note – 191

Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

SALTS
Batch Preheat for Glass and Related Furnace Processing Operations – 37

SAPPHIRE
Does Anyone Out There Know the Strength of Sapphire? – 199

SATELLITE ATTITUDE CONTROL
Adding Assurance to Automatically Generated Code – 161

SATELLITE COMMUNICATION
Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design – 14

SATELLITE IMAGERY
Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

SATELLITE NETWORKS
A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

Electrotechnical Review – 40

SATELLITE OBSERVATION
Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

SATELLITE SOUNDING
Monthly Report of the Meteorological Satellite Center: December 2003 – 77

Monthly Report of the Meteorological Satellite Center: November 2003 – 80

Monthly Report of the Meteorological Satellite Center: September 2003 – 80

SATELLITE TRACKING
Quality Assessment of Satellite-Based Global Gravity Field Models – 42

SIM: The Satellite and Missile Mission Simulator – 12

SATELLITE-BORNE INSTRUMENTS
TRMM Data from the Goddard Earth Sciences (GES) DISC DAAC: Tropical Rainfall Measuring Mission (TRMM) – 76

SCANNING ELECTRON MICROSCOPY
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

SCANNING
Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

SCATTERING
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

SCATTEROMETERS
Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

SCHEDULES
Overviews of the Apollo Program and Its Management – 10

Schedule Risk Assessment – 169

SCHEDULING
Load Balancing by MPLS in Differentiated Services Networks – 43

Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

SCIATIC REGION
The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

SCIENCE
Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry – 28

SCINTILLATION COUNTERS
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

SEA ICE
Fresh Water Content Variability in the Arctic Ocean – 82

Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

SECURITY
Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress – 162

Intrusion Detection Using Data Mining Techniques – 60

US National Security and Strategy. A Selected Bibliography – 204

SEDIMENTS
Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

SEISMOLOGY
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

SELENIUM
Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer – 97

SELF CONSISTENT FIELDS
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

SEMANTICS
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

SEMICONDUCTOR LASERS
Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

SEMICONDUCTORS (MATERIALS)
Helsinki University of Technology Deparment of Electrical and Communications Engineering, Electron Physics Laboratory Annual Report 2001 – 171

Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

SENSITIVITY ANALYSIS
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

SENSITIVITY

Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

SENSORY FEEDBACK

Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147

SHADOWGRAPH PHOTOGRAPHY

Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

SHAPE MEMORY ALLOYS

Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

SHAPES

Context Dependent Digital Image Shape Coding – 58

Video Object Shape Coding Using Control Point Optimization – 59

SHEAR

Control of Convection in Containerless Processing – 21

SHEATHS

Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114

Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

SHIELDING

Heavy-Ion Fusion Final Focus Magnet Shielding Designs – 194

SHOCK FRONTS

Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

SHOCK TUBES

Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

SHOCK WAVES

Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Shocked Clouds in the Vela Supernova Remnant – 206

Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

SHOCK

High Order Filter Methods for Shock/Turbulence MHD Flows – 53

SIGNAL PROCESSING

Optical Processing of Microwave Signals – 50

Opto-Microwave Signal Processing: Up and Down Conversion Techniques – 45

SIGNS AND SYMPTOMS

Differences in the Onset and Severity of Symptoms of Malignant Hyperthermia With Different Inhalational Anesthetics – 136

SILICA GEL

Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

SILICATES

Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

SILICON CARBIDES

Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Development of Ceramic Matrix Composites For High Temperature Applications – 23

SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

SILICON DIOXIDE

Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

SILICONES

Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

SILICON

Biological and Silicon Modeling of Moving Target Detection in Insects – 59

CDF Silicon Vertex Detector for Run II – 177

SILVER

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

SIMPLEX METHOD

Image-Driven Mesh Optimization – 149

SIMPLIFICATION

The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time – 101

SIMULATION

A Simulation Study on Cardiac Assist Device: Hemopump – 145

New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002 – 154

Properties of Materials for Designing Filters at Optical Frequencies – 190

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Simulation of Reaction Dynamics for Synthesis of Energetic Materials and Resistant Coatings – 21

SIMULATORS

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator – 132

Time-Sharing of a Visual In-Vehicle Task While Driving: Finding from the Task Occlusion Method – 146

SINGULAR INTEGRAL EQUATIONS

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

SKIN (ANATOMY)

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

SLAGS

Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

SODIUM COMPOUNDS

Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

SOFTWARE ENGINEERING

A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA – 204

Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

Platforms in Networks: Software Architecture and Operator Services – 41

SOIL MAPPING

Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

SOIL SAMPLING

Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

SOILS

Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

SOLAR ARRAYS

Journal of Spacecraft Technology – 16

SOLAR CORONA

Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Interpretive Tools for Analysis of Coronal Images – 222

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

Three-Dimensional Coronal Density Structure: 1. Model – 223

Understanding the Solar Sources of In Situ Observations – 226

SOLAR ENERGY

An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

Interpretive Tools for Analysis of Coronal Images – 222

SOLAR FLARES

Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

SOLAR MAXIMUM MISSION

New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

SOLAR OSCILLATIONS

NOAO/NSO Newsletter – 218

SOLAR PHYSICS

A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

SOLAR RADIATION SHIELDING

Preliminary Radiation Shielding Design for BOOMERANG – 176

SOLAR RADIATION

The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

SOLAR WIND

A Search for Solar Sources of High-Speed Solar Wind Streams – 226

Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Review of the Communications Research Laboratory – 225

Solar Wind/Magnetosphere/Ionosphere Coupling and the Temporal and Spatial Evolution of Boundary Layers using Cluster, Polar and other ISTP Satellites – 75

Understanding the Solar Sources of In Situ Observations – 226

SOLDERING

The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

SOLENOIDS

ITER CS Model Coil and CS Insert Test Results – 177

SOLID PHASES

Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

SOLID PROPELLANT ROCKET ENGINES

Ablative Thermal Protection: An Overview – 35

SOLID WASTES

An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

SOLIDIFICATION

Control of Convection in Containerless Processing – 21

Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

SOUND WAVES

NTT Technical Review – 47

Sound Speeds of Post-Failure Wave Glass – 37

SOUTHERN HEMISPHERE

A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

SPACE COLONIES

Lunar and Planetary Bases, Habitats, and Colonies – 11

SPACE HABITATS

Lunar and Planetary Bases, Habitats, and Colonies – 11

SPACE INFRARED TELESCOPE FACILITY

Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

SPACE MISSIONS

A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

SPACE SHUTTLES

Next Generation Spacecraft, Crew Exploration Vehicle – 12

SPACE TRANSPORTATION SYSTEM FLIGHTS

The Super Lightweight Interchangeable Carrier (SLIC) Project – 15

SPACE WEATHERING

Space Weathering: An Ultraviolet Indicator – 217

SPACE WEATHER

A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

SPACECRAFT MOTION

Atmospheric Density Dynamics and the Motion of Satellites – 12

SPACECRAFT REENTRY

Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

SPACECREWS

Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

Next Generation Spacecraft, Crew Exploration Vehicle – 12

SPATIAL DISTRIBUTION

Quality Assessment of Satellite-Based Global Gravity Field Models – 42

SPECTRAL REFLECTANCE

Properties of the Hermean Regolith – 220

SPECTRA

ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

SPECTROMETERS

Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

SPECTROSCOPY

Baryon Operators and Spectroscopy in Lattice QCD – 170

Brillouin Spectroscopy Data Base for Biological Threats – 205

Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals – 180

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

Proton MR Spectroscopic Imaging in NF-1 – 127

Quantitative Infrared Reference Library. Library 2 – 204

Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

SPECTRUM ANALYSIS

High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

The Composition and Physical Structure of the Io Torus and Atmosphere – 222

SPHERES

A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

SPHERICAL HARMONICS

Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

Why are the P(n) and S(n) Methods Equivalent – 175

SPHERICAL PLASMAS

Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

SPHERICAL SHELLS

Characteristic Matrices for Spherical Shell Photonic Systems – 188

SPHEROMAKS

Spheromak Formation Studies in SSPX – 192

SPIKE NOZZLES

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

SPINE

A Double-Blind Randomized Placebo Controlled Trial of Magnesium Oxide for Alleviation of Chronic Low Back Pain – 137

SPIN

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

SPRAYED COATINGS

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

STABILITY

Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

STAINLESS STEELS

Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment – 33

STAR FORMATION RATE

Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

STAR FORMATION

NOAO/NSO Newsletter – 218

STARS

An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

STATE ESTIMATION

Adding Assurance to Automatically Generated Code – 161

STATIC CHARACTERISTICS

Static Analysis of C Programs – 164

STATICS

Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

STATISTICAL ANALYSIS

Assessing Regression to the Mean and Intervention Effect – 42

External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach – 41

STATISTICAL DISTRIBUTIONS

Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency – 167

STATISTICAL MECHANICS

Statistical Error in Particle Simulations of Low Mach Number Flows – 56

STEADY STATE

Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

STELLAR MASS

An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

STIMULATION

Design and Implementation for the Prototype of a Microstimulator – 52

STIRLING CYCLE

Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

Free-Piston Stirling Convertor Controller Development at NASA Glenn Research Center – 59

STIRLING ENGINES

Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

STOCHASTIC PROCESSES

Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

Stochastic Optimal Control via Bellman's Principle – 164

STORAGE RINGS (PARTICLE ACCELERATORS)

Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Radiological Considerations for Top-Up Operation of the Storage Ring – 227

STRAIN ENERGY RELEASE RATE

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

STRAIN GAGES

Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

STRATEGY

US National Security and Strategy. A Selected Bibliography – 204

STREAMS

A Search for Solar Sources of High-Speed Solar Wind Streams – 226

A Search for the Solar Sources of High-Speed Streams – 223

STREETS

Officer Street-to-Fleet Database: Expanding Capabilities – 205

STRESS (BIOLOGY)

Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

STRESS (PHYSIOLOGY)

The Effect of Prostate Cancer Support Groups on Uncertainty – 138

STRESS (PSYCHOLOGY)

Effects of Stress and Relaxation on Time Perception – 139

STRESS RELAXATION

Effects of Stress and Relaxation on Time Perception – 139

STRESSES

The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

STRESS-STRAIN RELATIONSHIPS

Global Failure Modes in Composite Structures for High Altitudes – 24

Repair of Damaged Concrete Structures Using Prepreg Composites – 24

STRIATION

Kainate Receptors in the Striatum: Implications for Excitotoxicity in Huntington's Disease – 108

STRUCTURAL ENGINEERING
Proceedings of the Workshop on Lessons from the World Trade Center Terrorist Attack: Management of Complex Civil Emergencies and Terrorism-Resistant Civil Engineering Design – 203

STRUCTURAL PROPERTIES (GEOLOGY)
Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

STUDENTS
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

SUBSONIC SPEED
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

SUITS
+Gz Protection of a New Bladder Anti-G System – 140

SULFATES
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

SULFUR COMPOUNDS
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

SULFUR
Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

SUNYAEV-ZELDOVICH EFFECT
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

SUPERCOMPUTERS
RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data – 178

Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

SUPERCONDUCTING MAGNETS
ITER CS Model Coil and CS Insert Test Results – 177

SUPERCONDUCTIVITY
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Low and Intermediate Beta Cavity Design-A Tutorial – 179

Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

SUPERNOVA REMNANTS
A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

High Velocity Gas in the Line of Sight to the Vela SNR – 211

Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

Shocked Clouds in the Vela Supernova Remnant – 206

The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

SUPERPLASTICITY
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

SUPERSONIC AIRCRAFT
Jet Noise Modeling for Supersonic Business Jet Application – 9

SUPERSONIC FLOW
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

SUPERSONIC INLETS
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

SUPERSONIC JET FLOW
Jet Noise Modeling for Supersonic Business Jet Application – 9

SUPINE POSITION
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

SUPPLYING
The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

SUPPORT SYSTEMS
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

SUPPORTS
PEPC LRU: Ball Support Assembly – 186

SUPPRESSORS
Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

SURFACE CRACKS
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

SURFACE GEOMETRY
Multiresolution Distance Volumes for Progressive Surface Compression – 152

SURFACE PROPERTIES
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

SURFACE VEHICLES
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

SURFACE WATER
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

SURFACTANTS
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

SURGEONS
Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center – 127

SURGES
Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

SURGICAL INSTRUMENTS
The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

SURVEYS
Best Manufacturing Practices: Report of Survey Conducted at ABC Virtual Communications, Inc. West Des Moines, IA – 204

SURVIVAL
Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Ovarian Cancer Risk and Survival in BRCA 1/2 Carriers – 93

SWITCHING
Load Balancing by MPLS in Differentiated Services Networks – 43

SYNCHROTRONS
Ultrafast X-Ray Science at the Advanced Light Source – 171

SYNTHESIS (CHEMISTRY)
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

SYSTEM IDENTIFICATION
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia – 2

SYSTEMS ANALYSIS
Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

SYSTEMS ENGINEERING
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

SYSTEMS HEALTH MONITORING
An Architecture for Intelligent Systems Based on Smart Sensors – 11

SYSTEMS INTEGRATION
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

TARGET ACQUISITION
Biological and Silicon Modeling of Moving Target Detection in Insects – 59

TARGETS
Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

Biological and Silicon Modeling of Moving Target Detection in Insects – 59

Cyclin Dependent Kinase Inhibitors as Targets in Ovarian Cancer – 94

Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

TASKS
A Case Study of Job Satisfaction in Surgical Services at Martin Army Community Hospital – 123

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

TECHNOLOGIES
Science and Technology Text Mining: Nonlinear Dynamics – 203

Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

Science and Technology Transition Metrics – 112

TECHNOLOGY ASSESSMENT
A One-Stop Web Application for the Mars Team – 200

Investigating Web Map Service Client Technologies – 202

Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

TECHNOLOGY UTILIZATION
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Next Generation Spacecraft, Crew Exploration Vehicle – 12

TELECOMMUNICATION
NTT Technical Review – 47

TELEMEDICINE
Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics – 87

Strategic Analysis and Plan for Implementing Telemedicine at Fort Greely – 131

Telechemistry Projecting Laboratory Expertise to a Deployed TAML – 47

Telemedicine Evaluation and Management of Lumbar Disk Herniation – 124

Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients – 107

TELEPHONES
Review of the Communications Research Laboratory – 225

TELEROBOTICS
A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

TELESCOPES
Super-LOTIS Early Time Optical Counterpart Measurements – 212

The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR) – 60

TEMPERATURE DEPENDENCE
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

POINT 2003: A Temperature Dependent ENDF/B-VI, Release 8 Cross Section Library – 173

Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

TEMPERATURE MEASUREMENT
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

TEMPERATURE PROBES
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

TEMPERATURE SENSORS
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

TEMPORAL RESOLUTION
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

TENSILE PROPERTIES
Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

TENSILE TESTS
Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

TERRORISM
Proceedings of the Workshop on Lessons from the World Trade Center Terrorist Attack: Management of Complex Civil Emergencies and Terrorism-Resistant Civil Engineering Design – 203

TEST CHAMBERS
Investigation of the Electromagnetic Field Distribution in an Undermoded Reverberation Chamber – 48

TETRACYCLINES
Expression Profiling of Cell Lines Expressing Regulated NF2 Transcripts – 99

TETRAHEDRONS
LSPRAY-II: A Lagrangian Spray Module – 158

TEXTS
Science and Technology Text Mining: Nonlinear Dynamics – 203

Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

THEOREM PROVING
Rapid Prototyping in PVS – 155

THERAPY
Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

NF1 Tumor Specific Therapeutic Modeling – 89

Nurse Practitioners' Experience With Herbal Therapy – 139

Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy – 96

University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

THERMAL CONDUCTIVITY
Processing and Properties of HfB2 Based Materials – 29
Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

THERMAL CYCLING TESTS
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

THERMAL EMISSION
A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

THERMAL MAPPING
Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55
NOAO/NSO Newsletter – 218

THERMAL NEUTRONS
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

THERMAL PROTECTION
Ceramic Foams for TPS Applications – 15
Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22
Materials Science Work at NASA Ames Research Center – 30

THERMAL RADIATION
Physical Basis for the Maximum Thermal Radiation Emisssion between Materials – 190

THERMAL STABILITY
Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

THERMODYNAMIC PROPERTIES
LSPRAY-II: A Lagrangian Spray Module – 158

THERMODYNAMICS
AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics – 49
Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

THERMOLUMINESCENCE
Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

THERMONUCLEAR REACTIONS
Inertial Fusion and High-Energy-Density Science in the USA – 195

THERMOPHILES
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

THERMOPHYSICAL PROPERTIES
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

THERMOSETTING RESINS
Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

THERMOSPHERE
Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

THIAMINE
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

THIN PLATES
Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

THORIUM ISOTOPES
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

THREE DIMENSIONAL FLOW
High-Fidelity Three-Dimensional Simulation of the GE90 – 2
Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces – 18

THREE DIMENSIONAL MODELS
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74
Three-Dimensional Coronal Density Structure: 1. Model – 223

THRUST AUGMENTATION
Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

THRUSTORS
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

THRUST
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

THUNDERSTORMS
Global Lightning Activity – 79

TIME LAG
Frequency-Dependent Time Lags in Three Blazars – 215

TIME
Effects of Stress and Relaxation on Time Perception – 139

TIN OXIDES
Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions – 19

TISSUES (BIOLOGY)
Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145
The Formation of Ethanol in Postmortem Tissues – 25

TITANATES
Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

TITANIUM ALLOYS
Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

TITANIUM OXIDES
Properties of the Hermean Regolith – 220

TITANIUM
Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35

TITRATION
Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

TOKAMAK DEVICES
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

TOPOGRAPHY
Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74
Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

TOPOLOGY
Multiresolution Distance Volumes for Progressive Surface Compression – 152

TOROIDAL PLASMAS
The Composition and Physical Structure of the Io Torus and Atmosphere – 222

TORUSES
The Composition and Physical Structure of the Io Torus and Atmosphere – 222

TOTAL QUALITY MANAGEMENT
Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

TOXICITY
Mechanisms of a-Synuclein Aggregation and Toxicity – 107

NOx, Fine Particle and Toxic Metal Emissions from the Combustion of Sewage Sludge/Coal Mixtures: A Systematic Assessment – 72

TOXINS AND ANTITOXINS
Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

TRACHEA
The Effect of Endotracheal Inflation Technique on Endotracheal Cuff Pressure – 138

TRAFFIC
LED Headlamps: Glare and Color Rendering – 146

TRAJECTORIES
Atmospheric Density Dynamics and the Motion of Satellites – 12

TRANSFERRING
Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

TRANSMISSION ELECTRON MICROSCOPY
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

TRANSONIC SPEED
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

TRANSONIC WIND TUNNELS
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

TRANSPORT PROPERTIES
Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties – 191

TRANSPORT THEORY
Novel Parallel Numerical Methods for Radiation & Neutron Transport – 184

TRAVELING SALESMAN PROBLEM
An algorithm for the Asymmetric Traveling Salesman Problem – 168

TREES (MATHEMATICS)
Approximate Splitting for Ensembles of Trees using Histograms – 152

TRENDS
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

TRIANGULATION
Watertight Anisotropic Surface Meshing Using Quadrilateral Patches – 160

TRITIUM
Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

TRMM SATELLITE
TRMM Data from the Goddard Earth Sciences (GES) DISC DAAC: Tropical Rainfall Measuring Mission (TRMM) – 76

TUMORS
Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114

Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

NF1 Tumor Specific Therapeutic Modeling – 89

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Quest: A New Approach to Molecular Staging of Tumors – 125

Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

TURBINE BLADES
The Boundary Layer Over Turbine Blade Models with Realistic Rough Surfaces – 56

TURBOFAN ENGINES
High-Fidelity Three-Dimensional Simulation of the GE90 – 2

TURBOMACHINERY
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

TURBULENCE MODELS
TurMMAC Afterbody Application Challenge – 1

TURBULENCE
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

Pulsed-Sound Measurements of the Influence of High- Amplitude Noise on Boundary-Layer Transition to Turbulence – 181

Turbulence Simulations of X-point Physics on the L-H Transitions – 192

TURBULENT BOUNDARY LAYER
Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

TURBULENT FLOW
High Order Filter Methods for Shock/Turbulence MHD Flows – 53

TWO DIMENSIONAL MODELS
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Interpretive Tools for Analysis of Coronal Images – 222

Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

TYCHO CRATER
A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

TYROSINE
The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

ULTRAVIOLET DETECTORS
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

ULTRAVIOLET LASERS
P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

ULTRAVIOLET RADIATION
Space Weathering: An Ultraviolet Indicator – 217

The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

ULTRAVIOLET SPECTRA
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

ULTRAVIOLET SPECTROMETERS
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

UNDERWATER TESTS
Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

UNITED STATES
A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities – 134

Adherence to Hypercholesterolemia Management Guidelines by Health Care Providers in a USA Air Force Medical Treatment Facility – 117

UNIVERSE
Plans for Extreme Energy Cosmic Ray Observations from Space – 212

UNIVERSITIES
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Memoirs of the Faculty of Science, Kyoto University: Series of Physics, Astrophysics Geophysics and Chemistry – 28

UNIVERSITY PROGRAM
University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

UNSTEADY FLOW
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

The Near-Wall Behavior of Unsteady Vortical Flow Around the Tip of an Axial Pump Rotor Blade – 57

UNSTEADY STATE
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

URANIUM ALLOYS
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

URANIUM ISOTOPES
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

USER MANUALS (COMPUTER PROGRAMS)
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

VACCINES
Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

VALVES
Development of a Valve-Less Meso-Scale Pump – 63

VANADIUM ALLOYS
Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35

VAPOR DEPOSITION
Review of Navy Program to Develop Optical Quality Diamond Windows and Domes – 198

VAPOR PHASE EPITAXY
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

VAPOR PHASES
Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

VAPORIZERS
Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator – 132

VARIABILITY
Greenland Glacier Albedo Variability – 81

VEGETABLES
An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake – 66

VELOCITY MEASUREMENT
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

VELOCITY
TurMMAC Afterbody Application Challenge – 1

VERBAL COMMUNICATION
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

VERTICAL AIR CURRENTS
Global Lightning Activity – 79

VERY LONG BASELINE ARRAY (VLBA)
Frequency-Dependent Time Lags in Three Blazars – 215

VESTA ASTEROID
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

VIBRATION
Large Amplitude Vibrational Influence on Electron Transfer Reactions – 60

NIF PEPC Mechanical Test Stand Safety Note – 191

VIDEO COMMUNICATION
CmapTools: A Software Environment for Knowledge Modeling and Sharing – 157

VIDEO DATA
Video Object Shape Coding Using Control Point Optimization – 59

VIETNAM
The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center – 98

Veterans and Agent Orange. Health Effects of Herbicides Used in Vietnam – 139

VINEYARDS
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

VIOLENCE
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

Research on Child Abuse in the US Armed Forces – 120

Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits – 119

VIRUSES
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Characterization and Enhanced Processing of Soluble, Oligomeric GP140 Envelope Glycoproteins Derived from Human Immunodeficiency Virus Type-1 Primary Isolates – 112

Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

Targeting of Oncogenic Proteins for Intracellular Degradation – 118

VISION
A Study on Visual Search and Selection of Pull-down Menu – 83

VISUAL PERCEPTION
Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

VISUAL SIGNALS
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

VOICE DATA PROCESSING
NTT Technical Review – 47

VULNERABILITY
Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress – 162

Critical Infrastructure Protection: Challenges and Efforts to Secure Control Systems – 153

WALL PRESSURE

Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

WALLS

The Near-Wall Behavior of Unsteady Vortical Flow Around the Tip of an Axial Pump Rotor Blade – 57

WARFARE

Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War – 121

Malignants In The Body Politic: Redefining War Through Metaphor – 128

WARNING SYSTEMS

Intrusion Detection Using Data Mining Techniques – 60

WASTE DISPOSAL

Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

WASTE MANAGEMENT

Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

WASTE WATER

Evaluation of Proposed New LLW Disposal Activity: Disposal of Aqueous PUREX Waste Stream in the Saltstone Disposal Facility – 71

WATER TEMPERATURE

Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

WATER VAPOR

[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

WATER

An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake – 66

Geophysics of Martian Periglacial Processes – 220

WAVELET ANALYSIS

Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

WEAPON SYSTEMS

A Health Hazard Assessment for Blast Overpressure Exposures – 104

WEAR

Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

WEATHER FORECASTING

Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

Interpretive Tools for Analysis of Coronal Images – 222

Review of the Communications Research Laboratory – 225

The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

WEBSITES

Investigating Web Map Service Client Technologies – 202

WEIGHT ANALYSIS

Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

WEIGHT REDUCTION

The Super Lightweight Interchangeable Carrier (SLIC) Project – 15

WEIGHTING FUNCTIONS

The Super Lightweight Interchangeable Carrier (SLIC) Project – 15

WIND TUNNEL TESTS

Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia – 2

Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

WIND TUNNELS

Instrumentation for Wind Tunnel Transient Growth Studies – 4

WIND TURBINES

Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

WIND VELOCITY

Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

WINDS ALOFT

Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

WINGS

Wing Leading Edge Debris Analysis – 7

WIRELESS COMMUNICATION

Communication Channel in Urban Operations: A First Survey – 42

Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems – 44

WIRING

Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

WOOD

A Comprehensive Study of the Incentive Award Program at General Leonard Wood Army Community Hospital – 166

WORKLOADS (PSYCHOPHYSIOLOGY)

Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

WOUND HEALING

Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

X RAY ASTRONOMY

Low-mass X-ray Binaries with RXTE – 211

Measuring the Mass Distribution in Z is Approximately 0.2 Cluster Lenses with XMM, HST and CFHT – 214

Over-Luminous Elliptical Galaxies – 210

X RAY BINARIES

Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Low-mass X-ray Binaries with RXTE – 211

X RAY DETECTORS

Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

X RAY LASERS

Modeling of Short-Pulse-Driven Nickel-like X-Ray Laser and Recent Experiments – 189

Saturated Output Tabletop X-ray Lasers – 189

X RAY SOURCES

Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Ultrafast X-Ray Science at the Advanced Light Source – 171

X RAY SPECTRA

Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

Plasma Diagnostics in High-Resolution X-ray Spectra of Magnetic Cataclysmic Variables – 195

X RAY SPECTROSCOPY

Low-mass X-ray Binaries with RXTE – 211

X RAY TIMING EXPLORER

Frequency-Dependent Time Lags in Three Blazars – 215

X RAYS

A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

Composite Target Concept for Multi-Pulse Radiography – 172

Computational Simulations of High Intensity X-Ray Interaction – 20

Shocked Clouds in the Vela Supernova Remnant – 206

Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

XMM-NEWTON TELESCOPE

An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

YEAST

High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

YTTRIUM OXIDES

Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

ZINC ALLOYS

Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

ZIRCONIUM ALLOYS

Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Personal Author Index

Abbas, M. M.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Abdel-Aziz, Waleed
Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Abdou, A.
Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Abfalterer, W. P.
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

Ables, E.
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Prompt GRB Optical Follow-up Experiments – 213

Super-LOTIS Early Time Optical Counterpart Measurements – 212

Abumeri, Galib H.
Computational Data Compression for Effective Storage/Retrieval – 160

Adamek, D. H.
Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

Adams, James H., Jr.
Plans for Extreme Energy Cosmic Ray Observations from Space – 212

Adams, Sally
NOAO/NSO Newsletter – 218

Adkins, Wayne
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Adler-Golden, Steven
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

Adrian, M. L.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Affleck, Dave L.
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Aftosmis, Michael J.
Watertight Anisotropic Surface Meshing Using Quadrilateral Patches – 160

Agarwal, D.
Remote Operations in a Global Accelerator Network – 149

Ahokainen, T.
Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces – 18

Al-Amri, A. M. S.
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

Al-Amri, M. S.
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

Alderfer, David W.
Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

Alger, T.
PEPC LRU: Ball Support Assembly – 186

Al-Khalifah, T.
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

Allen, Christopher S.
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Allen, Glenn E.
A Study of the Non-Thermal X-ray Emission of Shell-Type Supernova Remnants – 221

Aller, Margo F.
Frequency-Dependent Time Lags in Three Blazars – 215

Anantram, M. P.
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Anderson, C.
The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

Anderson, R. W.
Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics – 56

Andersson, B. L.
Modeling of Low-Frequency Sound Propagation in the Baltic – 182

Andrews, Allyson M.
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Angel, S. M.
Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals – 180

Angier, Mike K.
The Formation of Ethanol in Postmortem Tissues – 25

Anikeev, S.
Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Anilkumar, A. V.
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

Applegren, P.
High Voltage Generation Research with the TTHPM System at FOI – 48

Arioli, M.
Null Space Algorithm and Spanning Trees in Solving Darcy's Equation – 149

Stopping Citerion for the Conjugate Gradient Algorithm in a Finite Element Method Framework – 148

Arnott, P.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Ar-Rajehi, A.
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

Ashpis, David E.
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

Ashworth, R.
TurMMAC Afterbody Application Challenge – 1

Asoka-Kumar, P.
Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

Atekwana, E. A.
Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Atlas, Robert
Impact of SeaWinds Scatterometer Data on Numerical Weather Prediction – 82

Autin, B.
Summary of Working Group 2 – 199

Avallone, Linnea M.
[Measurements of 'Total Water' and Carbon Dioxide from the NASA WB-57 During Crystal-Face] – 69

Avery, Shelly
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Back, C. A.
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Backer, Don
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Badnell, N. R.
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Bai, Jing
A Simulation Study on Cardiac Assist Device: Hemopump – 145

Space Medicine and Medical Engineering – 140

Bajd, Tadej
Electrotechnical Review – 40

Balas, M. J.
Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

Balasubramanian, S.
Forecasting Coronal Mass Ejections from Magnetograms – 225

Baldasaro, P. F.
Physical Basis for the Maximum Thermal Radiation Emisssion between Materials – 190

Band, D. L.
Super-LOTIS Early Time Optical Counterpart Measurements – 212

Band, D.
Prompt GRB Optical Follow-up Experiments – 213

Bandulet, H.
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

Bansal, Narottam P.
Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

Bardet, J. P.
Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

Barker, Peter B.
Proton MR Spectroscopic Imaging in NF-1 – 127

Barnes, Roberta J.
Beliefs and Practices of Active Duty Air Force Males Related to Testicular Cancer and Testicular Self- Examination – 120

Bartelt, M. C.
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

Barthelmy, S.
Prompt GRB Optical Follow-up Experiments – 213

Bartsch, T.
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Basak, S.
Baryon Operators and Spectroscopy in Lattice QCD – 170

Bateson, F. M.
Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

Baylink, David J.
Molecular Mechanisms of Soft Tissue Regeneration and Bone Formation in Mice: Implications in Fracture Repair and Wound Healing in Humans – 94

Beausang, J. F.
Physical Basis for the Maximum Thermal Radiation Emisssion between Materials – 190

Beckedahl, D. A.
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

Becker, Werner
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Beckman, Sarah
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Processing and Properties of HfB2 Based Materials – 29

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Beiersdorfer, P.
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Belenky, G.
Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Bell, Dave
NOAO/NSO Newsletter – 218

Beller, H. R.
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

Bennet, F.
SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

Berceli, Tibor
Opto-Microwave Signal Processing: Up and Down Conversion Techniques – 45

Berg, T.
Platforms in Networks: Software Architecture and Operator Services – 41

Bergsma, S. C.
Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

Berkovitz, Dustin
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Bernhardsdotter, Eva C. M. J.
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

Bertozzi, Carolyn R.
Metabolic Engineering of Reactive Cell Surfaces for Controlled Cell Adhesion – 116

Bertram, M.
Multiresolution Distance Volumes for Progressive Surface Compression – 152

Besenbruch, G. E.
Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

Betts, Bradley J.
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Beyer, Frederick L.
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

Biesecker, D.
Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Bilstein, Roger E.
Testing Aircraft, Exploring Space: An Illustrated History of NACA and NASA – 201

Binienda, Wieslaw K.
Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

Binienda, Wieslaw
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Bionta, R. M.
Computational Simulations of High Intensity X-Ray Interaction – 20

Bishai, M.
Beauty and Charm Physics at CDF Run II – 172

Bjarnholt, G.
High Voltage Generation Research with the TTHPM System at FOI – 48

Blandford, G. E.
Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Blankson, I. M.
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Blaurock, Carl
Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

Bless, S. J.
Sound Speeds of Post-Failure Wave Glass – 37

Blewett, D. T.
Properties of the Hermean Regolith – 220

Blyth, Joel
Investigating Web Map Service Client Technologies – 202

Boedo, J. A.
Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Bolinger, M.
Learning by Doing: The Evolution of State Support for Photovoltaics – 68

Bolton, Karl C.
Strategic Analysis and Plan for Implementing Telemedicine at Fort Greely – 131

Bonamente, Massimiliano
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Bonilla, Jose A.
Optimizing the Internal Medicine Clinic at Evans Army Community Hospital – 131

Booth-Kewley, Stephanie
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Borrego, J. M.
Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Bouman, J.
Quality Assessment of Satellite-Based Global Gravity Field Models – 42

Bowen, Brent D.
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Bowens, Laticla D.
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Box, Phillip
Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

Brackett, C. L.
Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

Bradford, Robert N.
Space-based Science Operations Grid Prototype – 158

Bradshaw, Richard C.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Bragg, Duane M.
An Analysis of Emergency Department Overcrowding at The Johns Hopkins Hospital – 98

Brahser, D.
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

Braley, Mike
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Brandau, C.
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Brase, J. M.
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

Brat, Guillaume
Static Analysis of C Programs – 164

Breitfeller, E. F.
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Brest, Janez
An algorithm for the Asymmetric Traveling Salesman Problem – 168

Brglez, Franc
Electrotechnical Review – 40

Brickhouse, Nancy
Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

Brinton, John C.
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

Britt, H. C.
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

Brnich, M. J.
Emergency Communication Triangle – 46

Brooks, W. K.
Hadronic Multi-Particle Final State Measurements with CLAS at Jefferson Lab – 170

Brostroem, E.
Investigation of the Electromagnetic Field Distribution in an Undermoded Reverberation Chamber – 48

Brown, D. L.
Accuracy of Projection Methods for the Imcompressible Navier-Stokes Equation – 55

Brown, G. V.
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Brown, James H.
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

Brown, N. J.
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Brown, P. N.
Novel Parallel Numerical Methods for Radiation & Neutron Transport – 184

Brown, P.
PVODE Trio: PVODE, KINSOL, and IDA – 154

Brugger, S. T.
TIGER LDRD – 170

Brumen, Bostjan
Procedure for Estimation of Error-rate of Classification Algorithms – 202

Bruneau, M.
Proceedings of the Workshop on Lessons from the World Trade Center Terrorist Attack: Management of Complex Civil Emergencies and Terrorism-Resistant Civil Engineering Design – 203

Buckner, Jason E.
An Evaluation of the Costs and Benefits Associated with Purchasing an Anesthesia Automated Record Keeper at Wilford Hall Medical Center – 102

Budwig, Ralph S.
The Boundary Layer Over Turbine Blade Models with Realistic Rough Surfaces – 56

Buehrle, Ralph D.
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Bulmer, R. H.
Spheromak Formation Studies in SSPX – 192

Buratti, P.
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

Burgess, Malcolm A.
The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

Butler, D.
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

Butler, J. E.
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Butler, Ricky
Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Rapid Prototyping in PVS – 155

Byers, Stephen W.
Targeting of Oncogenic Proteins for Intracellular Degradation – 118

Cabanilla, Juan
SIM: The Satellite and Missile Mission Simulator – 12

Cabera, Marco E.
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

Cabon, B.
Optical Architectures for Signal Processing – 187

Cabrera, Carlos R.
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Cabrera, Marco
Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

Cai, D. S.
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

Calamaio, Larry
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Calawa, D. R.
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Canas, Alberto J.
CmapTools: A Software Environment for Knowledge Modeling and Sharing – 157

Cano, Roberto J.
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Cantu-Paz, E.
Approximate Splitting for Ensembles of Trees using Histograms – 152

Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

Cao, Xin-Sheng
Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Caohuy, Hung
Membrane Fusion Protein Annexin 7: A Common Site of Action for Calcium, Guanosine Triphosphate, Protein Kinase C and Botulinum Toxin Type C in Regulated Exocytosis – 131

Carlstrom, John E.
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Carlstrom, T. N.
Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Carnahan, Thomas J.
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

Carr, C. W.
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

Carreno, Victor A.
Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations – 164

Carrreno, Victor A.
Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Carstenson, Larry
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Catalina, Adrian V.
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

Cavalcante, Celio L.
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Cazamias, J. U.
Sound Speeds of Post-Failure Wave Glass – 37

Cepin, Marko
Minimal Risk Based Optimisation of Safety Equipment Testing and Maintenance Scheduling – 64

Chabalowski, Cary F.
Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

Chakrabarty, Deepto
Accreting Neutron Stars as Astrophysical Laboratories – 209

Chamberlain, Heather
Research on Child Abuse in the US Armed Forces – 120

Chambers, D. M.
Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

Chamis, Christos C.
Computational Data Compression for Effective Storage/Retrieval – 160

Chang, B.
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods – 166

Chang, H.
Coherence Phenomena in Coupled Optical Resonators – 190

Chang, Richard K.
P-N Junction Diode Ultra-Violet Lasers with Directional Emission from Non-Circular Optical Cavities for Bio Sensing – 61

Chappell, Charles R.
A Study of Ion Outflow as a Source of Plasma for the Magnetosphere – 209

New ISTP Solar Max: A Multi-Spacecraft Study of the Flow of Ionospheric Plasma – 73

Chavez, Bonnie R.
Effects of Stress and Relaxation on Time Perception – 139

Chazelas, Jean
Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Chen, Feng
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Chen, H. L.
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

Chen, H.
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Chen, Injazz J.
Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

Chen, Jen-Jen H.
Adherence to Hypercholesterolemia Management Guidelines by Health Care Providers in a USA Air Force Medical Treatment Facility – 117

Chen, Juan
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Chen, Li-guo
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Chen, M. H.
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Chen, Wen Y.
Rational Design of Human Prolactin Receptor Antagonists for Breast Cancer Therapy – 96

Chen, Y.
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Chen, Yih-Kanq
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

Chen, Y.-K.
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

Chen, Zhi-qing
Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

Cheng, Jie
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Cheng, Jin Q.
Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Phosphoinositide 3-Kinase/AKT1 Pathway and Human Ovarian Cancer – 94

Chenier, C. L.
Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

Cheung, Christopher
Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

Chiang, Cheng-Ta
Design and Implementation for the Prototype of a Microstimulator – 52

Chien, Jennifer
Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Chin, A. H.
Ultrafast X-Ray Science at the Advanced Light Source – 171

Chin, H. N.
Validation of an Urban Parameterization in a Mesoscale Model – 150

Choi, Sang H.
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Chong, H. H. W.
Ultrafast X-Ray Science at the Advanced Light Source – 171

Chow, Alan S.
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Christian, Hugh J.
Global Lightning Activity – 79

Total Lightning Activity as Observed from Space – 80

Chu, Sang-Hyon
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Chuang, Catherine C.
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

Cid, Florencio
SIM: The Satellite and Missile Mission Simulator – 12

Ciebiera, L.
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Cirignano, L.
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Ciszak, E. M.
Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

Ciszak, Ewa M.
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Clark, Bruce J.
Jet Noise Modeling for Supersonic Business Jet Application – 9

Clemens, J. C.
The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR) – 60

Coefield, Ocie M.
Optimization and Management of Naval Hospital Bremerton's Military-Medicare Population by Market Analysis of the Naval Hospital Bremerton Empanelled Population – 100

Cohen, B. I.
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Spheromak Formation Studies in SSPX – 192

Cohen, R. H.
Turbulence Simulations of X-point Physics on the L-H Transitions – 192

Coleman, Barbara A.
The Effect of Claims Processing Work Simplification Initiatives on Network Non-Institutional Professional Claims Processing Time – 101

Coleman, D. J.
Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

Collins, Timothy J.
Adherence to Hypertension Management Recommendations for Patient Follow-Up Care and Lifestyle Modifications Made by Military Healthcare Providers – 126

Colombano, Silvano P.
Self-Sustaining Robotic Ecologies and Space Architecture – 162

Colwell, Joshua
Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Connors, M. K.
Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Cook, J. R.
Evaluation of Proposed New LLW Disposal Activity: Disposal of Aqueous PUREX Waste Stream in the Saltstone Disposal Facility – 71

Cook, N.
Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

Cook, R.
Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Cooper, Kevin E.
The Implementation of Reach Logistics in Support of the Department of the Army's Transformation Policy Including a Review of Forward Surgical Team Unit Assemblage Management – 134

Corletti, M. M.
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

Covert, D.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Cowart, Kris
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Cowell, John K.
Isolation of Genes from Chronosome Region 1p31 Involved in the Development of Breast Cancer – 106

Cox, Jennifer
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

Cox, Michael L.
A Comprehensive Study of the Incentive Award Program at General Leonard Wood Army Community Hospital – 166

Craven, P. D.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Crespo, Luis G.
Stochastic Optimal Control via Bellman's Principle – 164

Critchlow, T.
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

Csornyei, Mark
Opto-Microwave Signal Processing: Up and Down Conversion Techniques – 45

Cullen, D. E.
POINT 2003: A Temperature Dependent ENDF/B-VI, Release 8 Cross Section Library – 173

Why are the P(n) and S(n) Methods Equivalent – 175

Cunha, Gerald
Mammary Stromal Effects on Epithelial Differentiation and Expression of ESX and ErbB2 (HER2/neu) – 114

Cunningham, B.
CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Cunningham, M. F.
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Curreri, Peter A.
Microgravity Materials Research and Code U ISRU – 39

Cutting, Laurie E.
Magnetic Resonance Spectroscopy Imaging and Functional Magnetic Resonance Imaging of Neurofibromatosis Type I: In Vivo Pathophysiology Brain-Behavior Relationships and Reading Disabilities – 96

D'Agostino, Paul A.
Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

Dane, C. B.
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

Danehy, Paul M.
Survey of Temperature Measurement Techniques For Studying Underwater Shock Waves – 182

Daniels, Christopher
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Danon, Y.
Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture – 177

Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

Dao, V. N. P.
Performance of Neural Networks Methods in Intrusion Detection – 161

Daryoush, Afshin S.
Fiber Optic Distribution Networks for Military Applications – 45

Microwave Photonics in Dual-Use Military Systems: A Personal Perspective – 44

Novel Microwave Photonic Techniques in the Future Military Systems – 187

Dasgupta, Arnab
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

Davies, M.
TurMMAC Afterbody Application Challenge – 1

Davis, Dawnavan S.
My Body, My Weight: Body Perception Among African American and Caucasian First-Graders and Their Parents – 135

Davis, J. L.
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Davis, Jose M.
Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

de Supinski, B. R.
ASCI PSE Milepost: Run-Time Systems Performance Tests – 156

De Yoreo, J. J.
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

Decoster, D.
Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

DeHaven, M. R.
Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Delano, Chad
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

Delay, Susan H.
Validation of Ionospheric Models – 75

Delayen, J. R.
Low and Intermediate Beta Cavity Design-A Tutorial – 179

DellaCorte, Christopher
Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

delMundo, Rommel
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Delshad, M.
New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002 – 154

Denney, Ewen
Adding Assurance to Automatically Generated Code – 161

Depierreux, S.
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

deSilva, Shan
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Diefenbach, Michael A.
Facilitating Treatment Decision Making Adjustment and Coping in Men Newly Diagnosed with Prostate Cancer – 122

Dietrich, F. S.
Extensions of the Direct-Semidirect Model for Calculating the High Energy Component of Fast-Nucleon Induced Gamma Spectra – 184

Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

DiMauro, L. F.
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Dimits, A. M.
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Ding, C.
Bipartite Graph Partitioning and Data Clustering – 149

Ditillo, John
Quantitative Infrared Reference Library. Library 2 – 204

Divjak, Sasa
Electrotechnical Review – 40

Dmitriev, A.
Microwave Chaotic Sources – 52

Dobrzanski, Mark J.
Analysis of Tumor Antigen-Specific Tc1 and Tc2 CD8 Effector Cell Subpopulations as a Potential Therapeutic Agents in the Treatment of Progressive Breast Cancer – 109

Dobson, Chris C.
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

Doherty, Patricia H.
Validation of Ionospheric Models – 75

Dole, Mark J.
Neurosurgical Provider Proficiency: Clairification of Readiness and Management Implications – 108

Dolfi, Daniel
Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Domack, Marcia
Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

Dominiak, Paulina M.
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Donahue, R. J.
Preliminary Radiation Shielding Design for BOOMERANG – 176

Donetsky, D.
Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Donovan, T. J.
Application of Monte Carlo Chord-Length Sampling Algorithms to Transport through a 2-D Binary Stochastic Mixture – 177

Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

Dooher, B. P.
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

Dorsch, Matthias
Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

Dowek, Gilles
Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations – 164

Downs, Robert S.
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

Doyle, C.
USA Patriot Act Sunset: Provisions that Expire on December 31, 2005 – 46

Drish, Edward W.
Assessing the Value of Professional Coders in Ambulatory Healthcare Systems – 104

Drury, O.
Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Druzovec, Marjan
Procedure for Estimation of Error-rate of Classification Algorithms – 202

Duchaineau, M. A.
Multiresolution Distance Volumes for Progressive Surface Compression – 152

Duff, James W.
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

Dugan, James
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Dunand, D. C.
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

Dunn, J.
Modeling of Short-Pulse-Driven Nickel-like X-Ray Laser and Recent Experiments – 189

Saturated Output Tabletop X-ray Lasers – 189

Dunn, Mark
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

Dupont, Pierre E.
Design Methods for Machinery Emulators – 63

Dupont, S.
Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

Duris, J.
Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Durlach, Paula J.
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

Dutta, P. S.
Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Dyberg, K.
Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks – 41

Dzhuraev, A.
Elliptic Systems of Partial Differential Equations Generated by Vector Vields Which Degenerate at the Boundary of the Domain – 154

Ebbinghaus, B.
Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs – 36

Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

Echols, William T.
A Prospective Computer Simulation Study to Test the Impact of Consolidating Primary Care Out-Patient Services at McDonald Army Community Hospital – 109

Edahl, Robert A., Jr.
Effect of Thermal Exposure on the Tensile Properties of Aluminum Alloys for Elevated Temperature Service – 7

Edwards, J.
Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

Edwards, R.
Baryon Operators and Spectroscopy in Lattice QCD – 170

Egolfopoulos, Fokion N.
Experimental and Detailed Numerical Studies of Fundamental Flame Properties of Gaseous and Liquid Fuels – 167

Egudo, M.
A Review of Narrative Methodology – 155

Ehlschlaeger, C. R.
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

Elgin, Stephen C.
Overseas Medical Screening – 103

Elizabeth Margaret, Maloney
A Cohort Study of Health Effects of HTLV-I Infection in Jamaican Children and their Associations with Viral, Immunologic and Host Genetic Markers – 121

Elkins, G. E.
Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

Elleman, R.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Ellerby, Don
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Processing and Properties of HfB2 Based Materials – 29

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Elliot, N. S.
Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics – 56

Elmer, J. W.
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

Elsner, Ronald F.
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Emery, Edward F.
Ice Particle Impact on Cloud Water Content Instrumentation – 58

Emmerich, S. J.
Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

Engberg, Robert
Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

Enright, John P.
A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

Entine, G.
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Erickson, Gary E.
Wind Tunnel Application of a Pressure-Sensitive Paint Technique to a Faceted Missile Model at Subsonic and Transonic Speeds – 3

Eudy, L.
Challenges and Experiences with Electric Propulsion Transit Buses in the USA – 72

Evans, Charles R.
The SOAR Telescope Project Southern Observatory for Astronomical Research (SOAR) – 60

Evans, Mark L.
The Effect of Endotracheal Inflation Technique on Endotracheal Cuff Pressure – 138

Evans, Thomas W.
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

Evans, W. J.
Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

Everson, Richard B.
Evaluation of the Use of DNA Adduct Dosimetry to Optimize the Timing of High Dose Therapy for Breast Cancer – 99

Falcone, R. W.
Ultrafast X-Ray Science at the Advanced Light Source – 171

Falconer, D. A.
A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

Forecasting Coronal Mass Ejections from Magnetograms – 225

Falgout, R. D.
hypre: A Library of High Performance Preconditioners – 153

Falk, L.
The Information Flow in Network Based Defense – 43

Farman, L.
Antenna Arrays in Spatial Reuse TDMA Ad Hoc Networks – 41

Farr, Lynne
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Farritor, Shane
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Faxon, Don R.
Intrusion Detection Using Data Mining Techniques – 60

Feit, M. D.
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

Fenelius, S.
SceneServer, a 3D Software Assisting Developers of Computer Vision Algorithms – 150

Feng, Dai-Ya
Development and Application of Self-powered Short Arm Human Centrifuge – 141

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Feng, Hua-song
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Ferguson, Thomas V.
NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

Ferrante, John
Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34

Festou, Michael
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

Fieber, Lynne A.
Eletrophysiological Changes in NF1 – 88

Fiebig, R.
Baryon Operators and Spectroscopy in Lattice QCD – 170

Figueroa, Fernando
An Architecture for Intelligent Systems Based on Smart Sensors – 11

Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

Filman, Robert E.
A Bibliography of Aspect-Oriented Software Development, Version 1.1 – 200

Finkbeiner, Joshua
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Finn, Olivera J.
University of Pittsburgh Graduate Training Program in Breast Cancer Biology and Therapy – 92

Fischer, Bernd
Adding Assurance to Automatically Generated Code – 161

Fisher, D.
Report on the HPSS Database Benchmark – 152

Fisher, John
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Fisher, R.
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Fishman, G. J.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Fishman, Gerald J.
The Mystery of Gamma-Ray Bursts – 212

Fiske, P. S.
Sound Speeds of Post-Failure Wave Glass – 37

Fitch, J. P.
Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Flannagan, M. J.
LED Headlamps: Glare and Color Rendering – 146

Fleming, Gary A.
Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Fleming, W. J.
Batch Preheat for Glass and Related Furnace Processing Operations – 37

Fludra, A.
Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Fodor, I. K.
Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

Forman, William
Over-Luminous Elliptical Galaxies – 210

Foster, D. J.
Three-Dimensional Coronal Density Structure: 1. Model – 223

Foster, I.
Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms – 150

Foster, Rosemary
High Sensitivity SELDI Analysis of NF1 Interactors in Mammals Drosophila and Yeast – 124

Fox, Dennis S.
Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

Frank, A. M.
Nanosecond Frame Cameras – 48

Frantz, Frederick K.
National Institute of Justice Center Requirements Definition, Technical Assistance, Agile Test and Evaluation and Cyber Science Analysis – 159

Franzblau, A.
Ergonomic Risk Factors and Cumulative Trauma Disorders – 146

Frary, M.
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

Friedrich, S.
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Fritsch, F. N.
LEOS Interpolation Package – 174

Fu, Li-Shan
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Fuchs, J.
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

Fukuda, M.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Fukuda, S.
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Fuller, Kirk A.
Characteristic Matrices for Spherical Shell Photonic Systems – 188

Fung, Kwok H.
Brillouin Spectroscopy Data Base for Biological Threats – 205

Furlan, Joze
Electrotechnical Review – 40

Fushman, G. J.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Gaarde, M. B.
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Gahm, Gregory A.
Expert System Utilization for Behavioral Health – 125

Galarneau, Michael R.
Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

Gallagher, D. L.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Galvin, Mary E.
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

Gamayunov, K. V.
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

Gangopadhyay, Anup K.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Gao, Wen-Bin
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Garcia, A. L.
Statistical Error in Particle Simulations of Low Mach Number Flows – 56

Garner, Virginia A.
Nurse Practitioners' Experience With Herbal Therapy – 139

Garnham, J. B.
Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Garriott, Owen K.
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

Gary, G. A.
Forecasting Coronal Mass Ejections from Magnetograms – 225

Gasch, Matt
Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Gasch, Matthew
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Processing and Properties of HfB2 Based Materials – 29

Gash, A. E.
Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Gates, Tom
Constitutive Modeling of Piezoelectric Polymer Composites – 36

Ge, Xin-Fa
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Geisler, Eliezer
Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

Gen, Xi-Chen
+Gz Protection of a New Bladder Anti-G System – 140

Gendler, Sandra J.
Immunotherapeutic Strategies in Breast Cancer: Preclinical and Clinical Trials – 111

Gentile, C. A.
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Geoghegan, Sean
Investigating Web Map Service Client Technologies – 202

Gerber, Scott S.
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

Gerepka, Peter
Cost Benefit Analysis of Providing Level II Trauma Care at William Beaumont Army Medical Center (WBAMC) – 117

Gersonde, Rainer
Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

Geser, Alfons
Match-bounded String Rewriting Systems – 155

Giblin, Timothy
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Gibson, S. E.
Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Three-Dimensional Coronal Density Structure: 1. Model – 223

Gifford, M.
Challenges and Experiences with Electric Propulsion Transit Buses in the USA – 72

Gilchrist, Carol L.
Ethical Issues of Air Force Nurses Practitioners in Clinical Practice – 136

Gilinsky, M.
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Internal Designs Application for Inlet and Nozzle Aeroperformance Improvement – 6

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Gilinsky, Mikhail M.
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

Gilman, Patricia
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Giroux, Virginia A.
A Comparison of Diabetes Management in a Federal Prison with the National Standards of Care Published by the ADA in 1998 – 126

Giruzzi, G.
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

Glodo, J.
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Glover, T. E.
Ultrafast X-Ray Science at the Advanced Light Source – 171

Golob, Izidor
Procedure for Estimation of Error-rate of Classification Algorithms – 202

Golub, Robert A.
Noise Prediction for Advanced Aircraft Configurations Using the Equivalent Source Method – 8

Gong, Hui
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Gong, Jing-Bo
Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

Goode, S. R.
Fundamental Study of Laser-Induced Breakdown Spectroscopy using Fiber Optics for Remote Measurements of Trace Metals – 180

Goodin, D. T.
Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

Gordon, J. D.
External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

Gottliebsen, Hanne
Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Gould, N. I. M.
Interior-Point l1-Penality Method for Nonlinear Optimization – 168

Govindan, T. R.
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Gracely, E.
Biomechanics of Occupational Shoulder Injuries, Final Performance Report – 146

Grant, K.
PVODE Trio: PVODE, KINSOL, and IDA – 154

Green, Richard
NOAO/NSO Newsletter – 218

Green, Robert E., Jr.
Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

Greenhill, Lincoln J.
Is there an Obscured AGN in the Normal Galaxy IRASF01063-8034 – 208

Grindlay, Jonathan
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Groebner, R. J.
Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Gromov, V. G.
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Gronberg, J.
NLC Interaction Region Layout and Background Estimates – 179

Grossbard, Neil J.
Validation of Ionospheric Models – 75

Grugel, R. N.
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Grugel, Richard N.
Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

Grun, J.
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Gu, M.
Bipartite Graph Partitioning and Data Clustering – 149

Gubina, Ferdo
Electrotechnical Review – 40

Guhathakurta, Madhulika
Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

Guhathakurta, M.
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Physical Properties of a Coronal Hole from a Coronal Diagnostics Spectrometer, Mauna Loa Coronagraph, and LASCO Observations during the Whole Sun Month – 223

Three-Dimensional Coronal Density Structure: 1. Model – 223

Gullikson, E. M.
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Gulmond, Jennifer M.
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

Gunsman, Michael
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Guo, Hui
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Guo, Xiao-chao
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Gupta, Manish
Optimization of Off-Axis ICOS and Applications to Flow Tube Kinetics – 196

Gupta, Pramod
A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

Gurau, B.
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

Guruswamy, Guru P.
Use of the SCIRun PSE for Coupled Fluid-Structure Analysis – 161

Gusman, Michael
Processing and Properties of HfB2 Based Materials – 29

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Gutmann, R. J.
Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Guynes, Buddy
Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

Haberbusch, Mark
Flexible Cryogenic Temperature and Liquid-Level Probes – 53

Hackel, L.
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

Hadjiconstantinou, N. G.
Statistical Error in Particle Simulations of Low Mach Number Flows – 56

Haglin, David J.
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Haimes, Robert
Surface Generation and Cartesian Mesh Support – 160

Watertight Anisotropic Surface Meshing Using Quadrilateral Patches – 160

Hakkila, Jon
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Hakkinen, Sirpa
Fresh Water Content Variability in the Arctic Ocean – 82

Hall, David W.
Design, Development and Testing of Airplanes for Mars Exploration – 7

Hall, L. C.
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

Hallmark, J. S.
The Development of a Backfill Analysis Tool in the Army's Great Plains Regional Medical Command – 131

Halpin, J.
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

Ham, C. L.
RPF: An Extensible, Cross-Platform, Binary File Format for Radiation Physics Data – 178

Hamada, Kris
Systematic Effects in Color Photometry Data – 13

Hamada, M.
Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

Hammes-Schiffer, Sharon
Simulation of Reaction Dynamics for Synthesis of Energetic Materials and Resistant Coatings – 21

Hammond, Mark H.
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

Han, Xue-Ping
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Hancock, J. R.
Comparison of LC-ESI-MS and GC-MS for the Analysis of a Synthetic Tabun Sample – 29

Haney, Michael L.
TRICARE Plus: A Cost, Capacity and Enrollment Analysis – 103

Harada, A.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Hardee, P.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Harlow, C.
Development of an Aircraft Operation Classification System for Louisiana's Airports – 5

Harris, C. T.
Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Harris, D. A.
Summary of Working Group 2 – 199

Harris, Daniel G.
Does Anyone Out There Know the Strength of Sapphire? – 199

Review of Navy Program to Develop Optical Quality Diamond Windows and Domes – 198

Hartley, J. H.
Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

Hartman, Mia
NOAO/NSO Newsletter – 218

Hartmann, D. H.
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Hartouni, E. P.
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

Harwood, P.
CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Hatchett, S. P.
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

Hayashi, Y.
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

Hayes, J. P.
Ti-Cr-Al-O Thin Film Resistors – 37

Hayes, Julie A.
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Hayes, Ronald L.
Proteolytic Mechanisms of Cell Death Following Traumatic Brain Injury – 110

He, Ping
A Simulation Study on Cardiac Assist Device: Hemopump – 145

He, X.
Bipartite Graph Partitioning and Data Clustering – 149

Heaney, Robert P.
Ethnic and Environmental Influence on Vitamin D Requirement in Military Personnel – 107

Hedenmalm, H.
Weighted Bergman Spaces and the Integral Means Spectrum of Conformal Mappings – 148

Heelis, R. A.
Sensor Development for In-Situ Thermospheric Neutral Wind Measurements – 10

Heimann, Paula
Development of Ceramic Matrix Composites For High Temperature Applications – 23

Heled, Yuval
The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

Henderson, J. R.
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Hendrix, A. R.
Space Weathering: An Ultraviolet Indicator – 217

Hendrix, Amanda R.
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

Henninghausen,
The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

Hering, S.
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Hertzbach, S. S.
NLC Interaction Region Layout and Background Estimates – 179

Hesthaven, J.
Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

Hickman, D. P.
Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

Hill, D. N.
Spheromak Formation Studies in SSPX – 192

Hill, D.
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

Hiller, L. J.
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Himberger, John R.
Blood Sample Reliability Using Infusing Intravenous Lines – 129

Hindmarsh, A. C.
PVODE Trio: PVODE, KINSOL, and IDA – 154

Hinkle, Ken
NOAO/NSO Newsletter – 218

Hoeijer, M.
Comparison between High Level Radiated Susceptibility Tests and Coupling Measurements – 49

Hofbauer, Dieter
Match-bounded String Rewriting Systems – 155

Hoiden, Timothy J.
Referral Process Improvement: A Study of the Efficiency and Tracking Processes for In-house Referrals at Blanchfield Army Community Hospital – 102

Holcomb, Franklin H.
Distributed Electrical Power Generation: Summary of Alternative Available Technologies – 68

Holzer, T.
Three-Dimensional Coronal Density Structure: 1. Model – 223

Honig, J.
Lasershot(sm) Marking System: High-Volume Labeling for Safety-Critical Parts – 185

Honkanen, R.
Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

Hood, Robbie
Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

Hooper, E. B.
Spheromak Formation Studies in SSPX – 192

Horowitz, S.
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Houchard, Jeff
SIM: The Satellite and Missile Mission Simulator – 12

Houlihan, Sandra
Air Force Family Nurse Practitioner and Air Force Family Physician Perception of the Family Nurse Practitioner Role in Military Operations Other Than War – 121

How, Jonathan P.
Multi-Vehicle Experimental Platform for Distributed Coordination and Control – 40

Howard, Kevin
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Howard, W. M.
Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Howard-Reed, C.
Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

Howell, R. H.
Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

Hoyt, Richard W.
Alaska and the Alaska Federal Health Care Partnership – 88

Hrbud, Ivana
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, with Review of the 1-D Kinetic Model – 183

Huang, R. K.
Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Huang, Shuang
Vitronectin and Integrin alpha(v)Beta3 in Ovarian Carcinoma – 87

Huang, Zeng-ming
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Hughes, R.
TurMMAC Afterbody Application Challenge – 1

Huignard, Jean-Pierre
Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Hultman, T.
High Voltage Generation Research with the TTHPM System at FOI – 48

Hunt, L.
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Hunter, J. R.
Saturated Output Tabletop X-ray Lasers – 189

Hyers, R. W.
Control of Convection in Containerless Processing – 21

Hyers, Robert
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Ibragimov, N. H.
Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws – 148

Ippolito, Corey
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Irazoqui, Javier E.
Regulation of Cdc42/Rac Signaling in the Establishment of Cell Polarity and Control of Cell Motility – 87

Irby, Edward
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Processing and Properties of HfB2 Based Materials – 29

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Irwin, Daniel E.
Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

Isbell, Douglas
NOAO/NSO Newsletter – 218

Izumikawa, T.
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Jaakkola, Hannu
Procedure for Estimation of Error-rate of Classification Algorithms – 202

Jaeger, D.
Optoelectronic Components and Integration Devices: From Concepts to Applications – 50

Jaeger, Stephen M.
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Jain, Y. K.
Journal of Spacecraft Technology – 16

Jakl, Franc
Skin Effect Impact on Current Density Distibution in OPGW Cables – 49

James, Philip B.
[Analysis of Observations from Mars Global Surveyor] – 219

Jameson, L.
Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

Jankowski, A. F.
Ti-Cr-Al-O Thin Film Resistors – 37

Jansen, Mark
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Jensen, Robert E.
Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

Jerman, Gregory
Wing Leading Edge Debris Analysis – 7

Jette, M. A.
Characteristics of Workload on ASCI Blue-Pacific at Lawrence Livermore National Laboratory – 151

Jezernik, Karel
Electrotechnical Review – 40

Jiang, Shi-chen
Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Jiang, Shi-Zhong
Space Medicine and Medical Engineering – 140

Jin, G.
Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147

Jin, Yan-Bin
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Jin, Zhao
+Gz Protection of a New Bladder Anti-G System – 140

Johansson, P.
Communication Channel in Urban Operations: A First Survey – 42

Johnson, David A.
Are Landstuhl Regional Medical Center's Nurse Staffing Levels Predictors to Negative Patient Outcomes? – 89

Johnson, G. W.
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

Johnson, J. R.
Ouroboros: A Tool for Building Generic, Hybrid, Divide and Conquer Algorithms – 150

Johnson, J.
Load Balanced Domain Decomposition Method using Wavelet Analysis – 152

Johnson, Lee F.
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

Johnson, Patricia A.
Characterization of the Hen as a Model for Human Ovarian Cancer – 95

Johnson, Robert D.
The Formation of Ethanol in Postmortem Tissues – 25

Johnson, Sylvia M.
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Processing and Properties of HfB2 Based Materials – 29

Processing, Properties and Arc Jet Testing of HfB2/SiC – 35

Johnson, Sylvia
Materials Science Work at NASA Ames Research Center – 30

Jones, Harry
Using Technology Readiness Level (TRL), Life Cycle Cost (LCC), and Other Metrics to Supplement Equivalent System Mass (ESM) in Advanced Life Support (ALS) – 168

Jones, Tyrone L.
Ballistic Performance of Titanium Alloys: Ti-6Al- 4V Versus Russian Titanium – 35

Jones-Trower, Agnes Y.
Characterization and Enhanced Processing of Soluble, Oligomeric GP140 Envelope Glycoproteins Derived from Human Immunodeficiency Virus Type-1 Primary Isolates – 112

Jordanova, V. K.
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

Jorstad, Svetlana G.
Frequency-Dependent Time Lags in Three Blazars – 215

Josefik, Nicholas M.
Distributed Electrical Power Generation: Summary of Alternative Available Technologies – 68

Joswick, Jessetta K.
A Description of Anesthesia Personnel Characteristics in USA Army Medical Treatment Facilities – 134

Joy, Marshall K.
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Judeikis, H. S.
Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

Kadirvel, K.
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Kakar, Ramesh
Early Results of the NASA Convection and Moisture Experiment (CAMEX) – 67

Kallman, J. S.
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

TIGER LDRD – 170

Kalvala, Sara
Formal Modeling and Analysis of a Preliminary Small Aircraft Transportation System (SATS)Concept – 156

Kamath, C.
Approximate Splitting for Ensembles of Trees using Histograms – 152

Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

Kankaanpaeae, T.
Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

Karasalo, I.
Modeling of Low-Frequency Sound Propagation in the Baltic – 182

Karduna, A.
Biomechanics of Occupational Shoulder Injuries, Final Performance Report – 146

Kassner, M. E.
Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

Keiser, Christopher C.
Quantitative Infrared Reference Library. Library 2 – 204

Kekkonen, M.
Seminar Course on Advanced Metallurgical Processes/2002 – 19

Keller, K.
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

Keller, L.
NLC Interaction Region Layout and Background Estimates – 179

Kelton, K. F.
Control of Convection in Containerless Processing – 21

Kelton, Kenneth F.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Kennedy, Carolyn
Environmental Assessment for the NASA First Response Facility – 69

Kenny, Sean
Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

Kersen, U.
Gas-Sensing Potential of Nanocrystalline SNO2 Produced by Different Chemical Reactions and Milling Conditions – 19

Kessel, C. E.
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Kettunen, A.
Modeling of Microscale Variations in Methane Fluxes – 79

Keys, L. Ken
Collaborative Engineering for Research and Development – 199

Collaborative Product Development in an R&D Environment – 200

Khazanov, G. V.
Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The 2-7 May 1998 Storm – 74

Khodadadi, Jay M.
Development of a Valve-Less Meso-Scale Pump – 63

Kim, Jae-Woo
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Kimm, Gregory L.
Application of Headspace Solid Phase Microextraction and Gas Chromatography/Mass Spectrometry for Rapid Detection of the Chemical Warfare Agent Sulfur Mustard – 183

King, Glen C.
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

King, S. F.
Summary of Working Group 2 – 199

King, W. E.
Connectivity in Random Grain Boundary Networks – 33

Kirkorian, O.
Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

Kislyakov, A.G.
Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

Kissel, David E.
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Klein, Vladislav
Program of Research in Flight Dynamics in The George Washington University at NASA Langley Research Center, Hampton, Virginia – 2

Kleras, David E.
Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

Kluegel, Bradley C.
Improving the Quality of Medical Coding Data at Naval Hospital Bremerton – 103

Knauss, W. G.
Global Failure Modes in Composite Structures for High Altitudes – 24

Knorr, D. B.
Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

Koide, S.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Koivunen, V.
Delay Estimation in Long-Code Asynchronous DS/CDMA Systems Using Multiple Antennas – 43

Kolsrud, T.
Lagrangian Approach to Evolution Equations: Symmetries and Conservation Laws – 148

Kong, Edmund
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Konoske, Paula J.
Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

Konoske, Paula
Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Korhonen, T. M.
AgSn-Based Solder Alloys and Solder/Conductor Interactions in Lead-Free Electronics – 49

Korotchkina, Lioubov G.
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Kosir, Andrej
Context Dependent Digital Image Shape Coding – 58

Kostoff, Ronald N.
Science and Technology Text Mining: Nonlinear Dynamics – 203

Science and Technology Text Mining: Strategic Management and Implementation in Government Organization – 204

Science and Technology Transition Metrics – 112

Kotulas, Paul
Materials Science Work at NASA Ames Research Center – 30

Koty, Patrick P.
Breast Cancer Prevention by Inducing Apoptosis in DCIS Using Breast Ductal Lavage – 122

Kovats, Kenneth R., Jr
Organizational-Focused Outcomes of Patients Age 65 and Over Admitted to Department of Defense Health Care Facilities – 116

Krejsa, Eugene A.
Jet Noise Modeling for Supersonic Business Jet Application – 9

Krischer, Jeffrey P.
Advanced Cancer Detection Center – 95

Phase IIA Chemopreventive Study of Selenium in Persons at Risk for Long Lung Cancer – 97

Krogh, M.
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

Kroo, Eric
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Kssian, G.
Microwave Chaotic Sources – 52

Kudoh, T.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Kuguoglu, Latife H.
Computational Data Compression for Effective Storage/Retrieval – 160

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

Kuhn, Gerhard
Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

Kuhns, Joy B.
Materials Science Work at NASA Ames Research Center – 30

Kuklo, Timothy R.
Telemedicine Evaluation and Management of Lumbar Disk Herniation – 124

Kulander, K. C.
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Kulcinski, G. L.
Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Kumar, M.
Connectivity in Random Grain Boundary Networks – 33

Kumar, R. J.
Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Kunh, A.
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

Kuntz, Joshua
Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

Kurian, Mary K.
Effect of Textured Surfactant Brushes on Polymer- Layered Silicate Nanocomposite Morphology – 35

Kurman, Robert J.
Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment – 91

Kurtz, Andreas C.
Mitochondria Polymorphism in Neurofibromatosis Type 1 – 95

Kurz, Ebba U.
Activation of ATM by DNA Damaging Agents – 124

Kuzmin, L.
Microwave Chaotic Sources – 52

Kyte, Frank T.
Initial Results on the Meteoritic Component of new Sediment Cores Containing Deposits of the Eltanin Impact Event – 218

Labaune, C.
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

Labov, S. E.
Line-Splitting in High-Resolution Superconducting Tunnel Junction EUV Detectors – 186

Lages, Christopher R.
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

LaManna, Joseph C.
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

Lambert, John V.
Systematic Effects in Color Photometry Data – 13

Landen, O. L.
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Laney, D. A.
Multiresolution Distance Volumes for Progressive Surface Compression – 152

Lang, V.
Gas-Phase Rate Constant Measurements for Reactions of Ozone with Hydrazines – 21

Langford, Lester
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

Lankowicz, Andrew J.
Pharmacy Utilization: A Study to Predict BAMC Outpatient Pharmacy Usage by Dual-Eligible Military Retiree/Medicare-Eligible Beneficiaries Resulting From Implementation of the TRICARE Senior Pharmacy Program (TSRx) – 113

Lantz, F.
Platforms in Networks: Software Architecture and Operator Services – 41

LaRoque, Samuel J.
Determination of Cluster Distances from Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements – 213

Larsson, A.
High Voltage Generation Research with the TTHPM System at FOI – 48

Latkowski, J. F.
Heavy-Ion Fusion Final Focus Magnet Shielding Designs – 194

Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

Latysh, N. E.
External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

Lau, Benton
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Lau, Bernie
Ablative Thermal Protection: An Overview – 35

Laub, Bernard
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

Laufenberg, Larry
Getting the Most from the Twin Mars Rovers – 219

Laufenberg, Lawrence
A One-Stop Web Application for the Mars Team – 200

Laurance, William F.
Anthropogenic Land-use Change and the Dynamics of Amazon Forest Biomass – 77

Law, Chung K.
Dynamics of Droplet Collision and Flame Motion – 57

High-Speed Imaging System for Droplet Collision and Unsteady Combustion Studies – 163

Lawrence, Gareth
Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

Layton, D. W.
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

Lea IV, Paul M.
Modulation of Long-Term Potentiation and Epileptiform Activity in the Rat Dentate Gyrus by the Group II Metabotropic Glutamate Receptor Subtype mGluR3 – 138

Leach, M. J.
Validation of an Urban Parameterization in a Mesoscale Model – 150

Lebron, Marisabel
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

LeClair, A.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Lee, B. S.
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

Lee, B.
Multigrid Algorithms for Solving the Linear Boltzmann Equation Using First-Order System Least Squares Finite Element Methods – 166

Lee, C. P.
Direct Observation of Controlled Melting and Resolidification of Succinonitrile Mixtures in a Microgravity Environment – 31

Direct Observation of Pore Formation and Bubble Mobility during Controlled Melting and Resolidification in Microgravity – 38

Lee, Geun W.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Lee, J. J.
RF Photonics for Beamforming and Array Applications – 188

Wireless and Optics: A Survey and Overview of Broad Band Fiber-Fed Radio Systems – 44

Lee, Pascal
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Lee, S.
PVODE Trio: PVODE, KINSOL, and IDA – 154

Lee, Sueng-Jae
Role of Oligomeric a-Synuclein in Mitochondrial Membrane Permeabilization and Neurodegeneration in Parkinson's Disease – 115

Lees-Miller, Susan P.
Activation of ATM by DNA Damaging Agents – 124

Lehner, C. E.
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

Lembege, B.
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

Lepson, J. K.
Calibration Results of the EBIT Medium-Energy Flat-Field Spectrometer Using the LBL Advanced Light Source – 175

Lerner, Adam
Analysis of AND-34, A Novel p130Cas-Binding GDP Exchange Factor Implicated in the Development of Tamoxifen Resistance in Human Breast Cancer – 111

LeVan, Douglas
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

LeVan, M. Douglas
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Levri, Julie A.
System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

Lewalle, Jacques
Estimation of Time Scales in Unsteady Flows in a Turbomachinery Rig – 2

Lewis, P.
CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Lewis, Russell J.
The Formation of Ethanol in Postmortem Tissues – 25

Li, He-jie
Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Li, Li-Hua
+Gz Protection of a New Bladder Anti-G System – 140

Li, Rong
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Li, X.
Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

Li, Xiaofan
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Li, xiong
A Simulation Study on Cardiac Assist Device: Hemopump – 145

Li, Y.
Saturated Output Tabletop X-ray Lasers – 189

Lickteig, Carl W.
Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

Liedahl, D.
Completeness Criterion in Atomic Modeling – 179

Lillehei, Peter T.
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Lillie, Lyle
Ice Particle Impact on Cloud Water Content Instrumentation – 58

Lin, H. M.
Assessing Regression to the Mean and Intervention Effect – 42

Linder, S.
Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach – 41

Lindholm, S. L.
External Quality-Assurance Results for the National Atmospheric Deposition Program/National Trends Network, 1997-99 – 70

Lindsay, Richard S.
Staying Prepared for the Joint Commission: Restructuring for Continuous Accreditation, Reynolds Army Community Hospital – 100

Lindstrom, P.
Image-Driven Mesh Optimization – 149

Lines, Nichols J.
The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

Linker, Jon
Magnetohydrodynamic Modeling of Coronal Evolution and Disruption – 209

Understanding the Solar Sources of In Situ Observations – 226

Lipp, M. J.
Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

Littau, D.
Approximate Splitting for Ensembles of Trees using Histograms – 152

Liu, Bao-shan
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Liu, Bing-Kun
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

Liu, Fang
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Liu, Jing
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Liu, Mian
Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74

Liu, Xin-Min
Space Medicine and Medical Engineering – 140

Liu, Ying
A Study on Visual Search and Selection of Pull-down Menu – 83

Liu, Yong
Space Medicine and Medical Engineering – 140

LoDestro, L. L.
Spheromak Formation Studies in SSPX – 192

Loefsved, E.
Communication Channel in Urban Operations: A First Survey – 42

Loehman, Ron
Materials Science Work at NASA Ames Research Center – 30

London, R. A.
Computational Simulations of High Intensity X-Ray Interaction – 20

Lorenzana, H. E.
Metastability of Molecular Phases of Nitrogen: Implications to the Phase Diagram – 170

Lowman, Paul D., Jr.
A Proposed Robotic Astronomy Mission to the Lunar South Polar Regions – 221

Lozar, Robert C.
A Geographic Information Systems (GIS) and Imagery Approach to Historical Urban Growth Trends Around Military Installations – 160

Lu, Hai-ying
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Lundborg, B.
Communication Channel in Urban Operations: A First Survey – 42

Lunden, M. M.
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Luo, Qing-Ming
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Luo, Yue-Jia
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Luryi, S.
Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Lutter, Gregory A.
A Case Study of Job Satisfaction in Surgical Services at Martin Army Community Hospital – 123

Luu, K. K.
Atmospheric Density Dynamics and the Motion of Satellites – 12

Systematic Effects in Color Photometry Data – 13

Luvall, J. C.
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Ma, Hong-Bo
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Ma, Ning
Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Mackinnon, A.
Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

Maclean, S. C.
Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

Madison, Phillip H.
Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

Maghribi, M. N.
Microfabrication of an Implantable Silicone Microelectrode Array for an Epiretinal Prosthesis – 151

Magnin, V.
Optoelectronic Components and Integrated Circuits Including Up and Down Conversion Technique and Hybrid Integration Technology – 50

Mah, Robert W.
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Maienschein, J. L.
Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

Maitrejean, John
Officer Street-to-Fleet Database: Expanding Capabilities – 205

Malene, S. H.
Pressurization Analysis of Containers in the SAFKEG 3940A Package in KAMS (U) – 227

Mallett, L.
Emergency Communication Triangle – 46

Mallozzi, Robert S.
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Mandayam, Shreekanth
An Architecture for Intelligent Systems Based on Smart Sensors – 11

Manivannan, A.
Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry – 73

Mankowski, John J.
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Manzini, G.
Null Space Algorithm and Spanning Trees in Solving Darcy's Equation – 149

Marchetti, A. A.
Review of the Data Supporting the Lubrizol Evaluation of Multimedia Impacts Resulting from the Use of PuriNOx Fuel in California – 72

Marcu, Bogdan
NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

Marian, Frank
Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

Markiewicz, T.
NLC Interaction Region Layout and Background Estimates – 179

Marscher, Alan P.
Frequency-Dependent Time Lags in Three Blazars – 215

Marshall, L.
Choosing Reputable Resources in Atomistic Peer-to-Peer Environments – 147

Martin, Kamalini
Journal of Spacecraft Technology – 16

Martinez, Ed
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Martovetsky, N.
ITER CS Model Coil and CS Insert Test Results – 177

Maruyama, T.
NLC Interaction Region Layout and Background Estimates – 179

Maslanik, James A.
Improving the Simulation of Sea Ice Lead Conditions and Turbulent Fluxes Using RGPS Products and Merged RADARSAT, AVHRR and MODIS Data – 67

Mason, D.
Mechanical Engineering Safety Note - PEPC Spreader Bar Assembly – 185

Massie, Jodi A.
Changes in Weight Experienced by Female Inmates in the Federal Bureau of Prisons – 130

Mathieu, Jennifer
An Early Fault Detection System for Hydroponic Crop Production: Computer Simulation of Water and Nutrient Uptake – 66

Matko, Drago
Electrotechnical Review – 40

Matson, D. M.
Control of Convection in Containerless Processing – 21

Matson, N. E.
Reducing Indoor Residential Exposures to Outdoor Pollutants – 69

Matsuta, K.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Mattei, J. A.
Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

Mauche, C. W.
Optical and EUV Light Curves of Dwarf Nova Outbursts – 212

Plasma Diagnostics in High-Resolution X-ray Spectra of Magnetic Cataclysmic Variables – 195

Max, N. L.
Multiresolution Distance Volumes for Progressive Surface Compression – 152

Max, N.
Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Maynard, Nelson C.
Solar Wind/Magnetosphere/Ionosphere Coupling and the Temporal and Spatial Evolution of Boundary Layers using Cluster, Polar and other ISTP Satellites – 75

Mazuruk, Konstantin
Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment – 164

McCally, Russell L.
Corneal Damage From Mid-Infrared Laser Radiation – 105

McCarrick, J.
Composite Target Concept for Multi-Pulse Radiography – 172

McCarthy, Marianne
Centennial of Flight Educational Outreach – 227

McClatchey, Andrea I.
Utilization of a NF2-Mutant Mouse Strain to Investigate the Cellular and Molecular Function of the NF2 Tumor Suppressor Merlin – 96

McComas, D.
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

McCurdy, Rodney K.
A Comparison of the Audit and Accreditation Tools Used By The Health Care Financing Administration, The Texas Department of Insurance, and The National Committee on Quality Assurance: The Cost of Multi-Agency Oversight on Medicare+Choice Plans in Texas – 97

McFarland, K. S.
Summary of Working Group 2 – 199

McGrath, Melissa
The Composition and Physical Structure of the Io Torus and Atmosphere – 222

McKenna, Gregory B.
Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

McLean, Andrew
Dynamic Impulse Calibration of 100 MPa Blast Pressure Transducers – 58

Mclean, Hugh A., Jr
Implementation of Provider Perspectives Resulted in Proper Health Care Resource Utilization – 100

McNamara, Leo F.
Validation of Ionospheric Models – 75

McNaughton, Sandra N.
Current Practices in Injury Prevention and Safety Helmet Use Among Head Injury Patients in an Army Outpatient Care Setting – 133

Meade, D.
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Meador, Michael
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Meeting, John G.
A Study of Outpatient Pharmacy Utilization at Naval Hospital, Camp Lejeune – 104

Mehrez, H.
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Meichsner, J.
International Conference on Phenomena in Ionized Gases (26th) Held in Greifswald, Germany on 15-20 July 2003. Proceedings, Volume 4 – 196

Meier, R.
Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

Meier, W. R.
Heavy-Ion Fusion Final Focus Magnet Shielding Designs – 194

Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Mellon, Michael T.
Geophysics of Martian Periglacial Processes – 220

Merrill, Lex L.
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

Research on Child Abuse in the US Armed Forces – 120

Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits – 119

Meyer, David E.
Computational Modeling of Human Multiple-Task Performance and Mental Workload – 163

Michael, P.
ITER CS Model Coil and CS Insert Test Results – 177

Michel, P.
Temporal Incoherence Induced Upon a High-Intensity Beam by Plasma Propagation – 174

Mignani, Roberto
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Mihara, M.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Mikic, Zoran
A Search for Solar Sources of High-Speed Solar Wind Streams – 226

Understanding the Solar Sources of In Situ Observations – 226

Milkas, Linda
Regulatory Control of Breast Tumor Cell Poly (ADP- Ribose) Polymerase – 110

Miller, David W.
A Real-Time Simulator for the SPHERES Formation Flying Satellites Testbed – 13

Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

Miller, Dean R.
Ice Particle Impact on Cloud Water Content Instrumentation – 58

Miller, M. C.
Multi-Kilovolt X-Ray Conversion Efficiencies – 186

Miller, Robert A.
Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

Miller, Susan
Centennial of Flight Educational Outreach – 227

Milligan, Jeffery L.
Correlates for Utilization of Preventive Medicine Through the Use of Clinical Reminders at the Central Texas Veterans Health Care System – 129

Mills, W. J.
Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment – 33

Milner, Joel S.
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

Milos, Frank S.
Finite-Rate Ablation Boundary Conditions for Carbon-Phenolic Heat-Shield – 14

Milovich, J. L.
Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

Minagawa, Rahn Y.
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Minamisono, T.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Minervini, J.
ITER CS Model Coil and CS Insert Test Results – 177

Miranda, Felix A.
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Mitchell, Marguerite T.
Medical Readiness of Air Force Members Not on Deployment for Shortfall Deployments – 133

Mitchell, Mark
Fiber-Optic Strain-Gage Tank Level Measurement System for Cryogenic Propellants – 39

Mitchell, M.
A Review of Narrative Methodology – 155

Miyake, T.
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Modugno, Francesmary
Ovarian Cancer Risk and Survival in BRCA 1/2 Carriers – 93

Moe, H. J.
Radiological Considerations for Top-Up Operation of the Storage Ring – 227

Moir, R. W.
Edge Plasma Analysis for Liquid-Wall MFE Concepts – 176

Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Mok, Samuel C.
Multidisciplinary Strategies in the Prevention and Early Detection of Ovarian Cancer – 86

Molitoris, J. D.
Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Monson, Svend
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Montague, Gerald
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Montalvo, Alfredo
Telemedicine-Based Burn Research Initiative: Longitudinal Outcomes of Patients – 107

Moore, Angelo D.
Assessing the Knowledge, Self-Efficacy and Health Behaviors of Male Beneficiaries Assigned to the National Capital Area Regarding Participation in Prostate Screening – 132

Moore, R. C.
A Focused Review of the Interrelationship between Productivity, Data Quality, Compliance, and Diagnosis Patterns in the Family Health Clinic, Moncrief Army Community Hospital – 101

Moore, R. L.
A Measure from Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections – 225

Forecasting Coronal Mass Ejections from Magnetograms – 225

Moran, Daniel S.
The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

Morgan, Morris H., III
Advanced Methods for Aircraft Engine Thrust and Noise Benefits: Nozzle-Inlet Flow Analysis – 5

Morrill, Jason A.
Prediction of the Formulation Dependence of the Glass Transition Temperature for Amine-Epoxy Copolymers Using a Quantitative Structure-Property Relationship Based on the AM1 Method – 38

Morris, J. R.
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Morris, Jon
An Architecture for Intelligent Systems Based on Smart Sensors – 11

Morris, Mark K.
A Readiness Evaluation of Professional Filler System and Forces Command Nurses at Darnall Army Community Hospital, Fort Hood, Texas – 89

Morscher, Gregory N.
SiC/SiC Life Modeling at Intermediate Temperatures under NASA UEET – 24

Motil, Brian
Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Mueller, Carl H.
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Mueller, F.
Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

Muir, David F.
NF1 Tumor Specific Therapeutic Modeling – 89

Mukherjee, Amiya
Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

Mulloth, Lila M.
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Mulloth, Lila
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

Munoz, Cesar A.
Rapid Prototyping in PVS – 155

Munoz, Cesar
Abstract Model of the SATS Concept of Operations: Initial Results and Recommendations – 164

Murdock, Peter H.
U.S. Army Nursing Readiness: A Field Administration of the Readiness Estimate and Deployability Index (READI) in the North Atlantic Regional Medical Command (NARMC) – 101

Mushotsky, Richard
Over-Luminous Elliptical Galaxies – 210

Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

Musick, R.
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

Nagib, Hassan M.
Impact of External, Wall, and Pressure-Gradient Conditions on Overlap Region Parameters in High Reynolds Number Boundary Layers – 57

Najita, Joan
NOAO/NSO Newsletter – 218

Nakazato, M.
Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Nangia-Makker, Pratima
Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Narayana, K. Badari
Journal of Spacecraft Technology – 16

Nellis, W. J.
Metallization of Hydrogen and Other Small Molecules at 100 GPa Pressures – 175

Nelson, Brad H.
Eliciting Autoimmunity to Ovarian Tumors in Mice by Genetic Disruption of T Cell Tolerance Mechanisms – 127

Neumann, John L.
Coding Verbal Interactions in a Prototype Future Force Command and Control Simulation – 46

Nevins, W. M.
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Turbulence Simulations of X-point Physics on the L-H Transitions – 192

Newman, Sara B.
An Epidemiologic Analysis of Chlamydia trachomatis and Neisseria gonorrhoeae Infections in Female Federal Prisoners – 117

Ng, Joseph D.
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

Nguyen, QuynGiao N.
Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Nichols, Joy S.
High Velocity Gas in the Line of Sight to the Vela SNR – 211

Shocked Clouds in the Vela Supernova Remnant – 206

Nicosia, Santo V.
Cell Growth and Survival in Ovarian Epithelial Cancer Project 1: AKT2 Oncogene and Its Associated Protein APBP in Human Ovarian Cancer – 91

Niedermayr, T.
Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Nieh, T. G.
Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

Nikroo, A.
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

Nilsen, J.
Modeling of Short-Pulse-Driven Nickel-like X-Ray Laser and Recent Experiments – 189

Saturated Output Tabletop X-ray Lasers – 189

Nishikawa, K. I.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Nishikawa, K.-I.
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

Nobile, A.
Overview of IFE Chamber and Target Technologies R&D in the U.S – 193

Nojiri, Y.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Norris, Andrew
High-Fidelity Three-Dimensional Simulation of the GE90 – 2

Noy, A.
Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

Nummally, W. C.
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

Nyholm, S. E.
High Voltage Generation Research with the TTHPM System at FOI – 48

O'Carroll, David
Biological and Silicon Modeling of Moving Target Detection in Insects – 59

ODea, Damian
Investigating Web Map Service Client Technologies – 202

Odegard, Gregory M.
Constitutive Modeling of Piezoelectric Polymer Composites – 36

Ofman, Leon
Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

Interpretive Tools for Analysis of Coronal Images – 222

O'Haver, Timothy G.
Analysis of the Relationship Between Predictors of No-Show Appointment Behavior and the Benefit of Automated Patient Reminders – 92

O'Keefe, Anthony
Optimization of Off-Axis ICOS and Applications to Flow Tube Kinetics – 196

Olejniczak, Joe
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Oliver, S. S.
Advanced Adaptive Optics Technology Development – 189

Oliversen, Ronald J.
Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

Spectroscopic Determination of the Physical Conditions in Hot Optically Thin Sources – 185

Olsen, M. E.
Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

Olson, Cheryl B.
Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits – 119

Onishi, T.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Onyuksel, Hayat
Tc-99m Labeled and VIP Receptor Targeted Liposomes for Effective Imaging of Breast Cancer – 123

Ooi, Teng K.
Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions – 51

Opila, Elizabeth J.
Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Orban, D.
Interior-Point l1-Penality Method for Nonlinear Optimization – 168

Orme, C. A.
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

ORourke, T. D.
Proceeedings of the U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures against Soil Liquefaction (8th) – 65

Orth, Robin
SIM: The Satellite and Missile Mission Simulator – 12

Osterheld, A. L.
Saturated Output Tabletop X-ray Lasers – 189

Pace, Gregory
Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Paciesas, William S.
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Pahre, Michael A.
Evolution of Galaxies and the Star Formation Rate in the Infrared – 208

Palazzolo, Alan
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Pandolf, Kent B.
The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

Pang, Gerald
Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Validating Medical Supply Requirements for Emergent and Routine Care Aboard General Medical Officer (GMO) Platforms – 120

Papadopoulas, Vassilios
Peripheral Benzodiazepine Receptor (PBR) in Human Breast Cancer – 94

Papasin, Richard
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Papworth, A. J.
Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

Parcell, Ann D.
Officer Street-to-Fleet Database: Expanding Capabilities – 205

Park, H. S.
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Prompt GRB Optical Follow-up Experiments – 213

Super-LOTIS Early Time Optical Counterpart Measurements – 212

Park, Yeonjoon
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Parker, Richard
The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

Parker, Robert O.
The Future Impact of Vietnam Era Veterans on Inpatient Acute Care and Mental Health Product Lines at a Veterans Affairs Medical Center – 98

Parker, S.
Kinetic Electron Closures for Electromagnetic Simulation of Drift and Shear-Alfven Waves (II) – 175

Parmar, hema R.
Mammary Stromal Effects on Epithelial Differentiation and Expression of ESX and ErbB2 (HER2/neu) – 114

Parsells, R.
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Patel, Hemant D.
Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Patel, Mulchand S.
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Patrick, Clint
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Patton, B.
Switchyard Enclosure Bolted Connection Calculations – 169

Pavlov, George G.
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Peggs, S.
Remote Operations in a Global Accelerator Network – 149

Pember, R. B.
Staggered Grid Lagragian Method With Local Structured Adaptive Mesh Refinement for Modeling Shock Hydrodynamics – 56

Pendleton, Geoffrey N.
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Peng, S. S.
Evaluation of Roof Bolting Requirements Based on In-Mine Roof Bolter Drilling. Quarterly Technical Progress Report, July 1, 2001-September 30, 2001 – 65

Peng, Wen-zhen
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Peng, Xiao-Hu
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Penn, Linda Z.
Exploiting the Novel Repressed Transactivator Assay to Identify Protein Peptide Inhibitors of the Myc Oncoprotein – 98

Penner, Joyce E.
A Study of the Relationship Between Anthropogenic Sulfate and Cloud Drop Nucleation – 71

Perchonok, Michele H.
System-level Analysis of Food Moisture Content Requirements for the Mars Dual Lander Transit Mission – 216

Pereira, J. Michael
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Perez-Davis, Maria
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Perez-Prado, M. T.
Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

Perkins, David R.
An Overview of the Air Force's Electric Propulsion Program – 13

Pernu, H.
Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

Pernus, Franjo
Electrotechnical Review – 40

Perrino, C. T.
Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

Perry, Jay
Integrated System Design for Air Revitalization in Next Generation Crewed Spacecraft – 15

Peterson, Paul L.
Collaborative Product Development in an R&D Environment – 200

Petrilak, Thomas J.
Innovation on a Hospital Perinatal Unit: Cell Phone Use by Nurses – 47

Pettegrew, Richard D.
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

Pietras, Richard J.
Targeting Angiogenic Factors Contributing to Etiology and Progression of Human Ovarian Cancer – 115

Pinto, Mauricio R.
Conjugated Polyelectrolytes: Synthesis and Applications – 28

Pinto, Nicholas J.
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Pisanich, Greg
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Pisharody, Suresh
Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Pitsilis, G.
Choosing Reputable Resources in Atomistic Peer-to-Peer Environments – 147

Plaskon, Stephen R.
Ice Particle Impact on Cloud Water Content Instrumentation – 58

Plice, Laura
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Polikar, Robi
An Architecture for Intelligent Systems Based on Smart Sensors – 11

Ponce, Joseph A.
The Privacy Officer: A Critical Success Factor in the Implementation and Maintenance of HIPAA Legislation in DoD Medical Treatment Facilities – 90

Pope, G. A.
New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002 – 154

Popovic, Zoya
Multibeam Phased Array Antennas – 191

Porrata, R. A.
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Super-LOTIS Early Time Optical Counterpart Measurements – 212

Porter, G. D.
Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Turbulence Simulations of X-point Physics on the L-H Transitions – 192

Post, R. F.
Open and Closed Magnetic Confinement Systems: Is There a Fundamental Difference in Their Transport Properties – 191

Prabhu, D. K.
Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

Proshutinsky, Andrey
Fresh Water Content Variability in the Arctic Ocean – 82

Provencal, R.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Provenza, Andrew
High Speed, High Temperature, Fault Tolerant Operation of a Combination Magnetic-Hydrostatic Bearing Rotor Support System for Turbomachinery – 8

Pu, Jing-Sui
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Puccetti, Matt
SIM: The Satellite and Missile Mission Simulator – 12

Pulone, Luigi
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Pulst, Stefan M.
Expression Profiling of Cell Lines Expressing Regulated NF2 Transcripts – 99

Pusey, Marc L.
Enzymatic Properties of an Alkaline and Chelator Resistant alpha-amylase from the Alkaliphilic Bacillus sp. Isolate L1711 – 85

Pusey, Mark L.
Cloning and Characterization of an alpha-amylase Gene from the Hyperthermophilic Archaeon Thermococcus Thioreducens – 85

Qian, Ling-Jia
Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

Qu, Yi
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Quigley, John F.
Autonomic and Hemodynamic Correlates of Daily Life Activity and Ambulatory Myocardial Ischemia in Patients with Stable Coronary Artery Disease – 128

Radhakrishnan, Krishnan
A Quantitative Study of Oxygen as a Metabolic Regulator – 84

Systematic Sensitivity Analysis of Metabolic Controllers During Reductions in Skeletal Muscle Blood Flow – 83

Radousky, H. B.
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

Radovinsky, A.
ITER CS Model Coil and CS Insert Test Results – 177

Raju, M. S.
LSPRAY-II: A Lagrangian Spray Module – 158

Raman, Ganesh
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Ramshaw, J. D.
Composite Species in the Hydrodynamic Theory of Atomic Mixing in Multicomponent Partially Ionized Gases – 174

Ran, Jun-guo
Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

Rantakokko, J.
Higher-Order Statistics Based Estimation of Intersystem Interference in Digital Communication Systems: A Kurtosis Approach – 41

Rathz, Thomas J.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Ratner, Stuart
Enhancing the Effectiveness of Breast Cancer Immunotherapy Through Manipulation of the T Cell Cytoskeleton – 113

Rawls, G. B.
Pressurization Analysis of Containers in the SAFKEG 3940A Package in KAMS (U) – 227

Raz, Avraham
Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Redman, Sandra
Space-based Science Operations Grid Prototype – 158

Regan, Timothy F.
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

Regan, Timothy
Free-Piston Stirling Convertor Controller Development at NASA Glenn Research Center – 59

Ren, Chong-Yu
Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

Ren, Hui-Rong
Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

Rensink, M. E.
Turbulence Simulations of X-point Physics on the L-H Transitions – 192

Rensink, M.
Edge Plasma Analysis for Liquid-Wall MFE Concepts – 176

Revilock, Duane M., Jr.
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Reyes, S.
Preliminary Safety Assessment for an IFE Target Fabrication Facility – 193

Progress in Safety and Environmental Aspects of Inertial Fusion Energy at Lawrence Livermore National Laboratory – 193

Reynolds, Ian J.
Mitochondrial Mechanisms of Neuronal Injury – 106

Ricci, K.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Rice, D.
Remote Operations in a Global Accelerator Network – 149

Richardson, G.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Rickman, Doug
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Ridge, Jerry
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Riley, Pete
Understanding the Solar Sources of In Situ Observations – 226

Roberts, Gary D.
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Fracture Mechanics Analysis of an Annular Crack in a Three-Concentric-Cylinder Composite Model – 163

Robey, H.
Gaseous Laser Targets and Optical Diagnostics for Studying Compressible Hydrodynamic Instabilities – 194

Robinson, Daryl C.
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Robinson, Raymond C.
Oxidation of Ultra-High Temperature Ceramics in Water Vapor – 22

Rodgers, A.
Analysis of Regional Travel Time Data from the November 1999 Dead Sea Explosions Observed in Saudi Arabi – 25

Rodriguez, Gustavo C.
Characterization of the Chicken Ovarian Cancer Model – 88

Roesler, S.
Computational Simulations of High Intensity X-Ray Interaction – 20

Rogers, J. R.
Control of Convection in Containerless Processing – 21

Rogers, Jan C.
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys – 32

Rogers, Janet
Chlamydia Screening Decision Study – 130

Rognlien, T. D.
Edge Plasma Analysis for Liquid-Wall MFE Concepts – 176

Modeling the Effect of Drifts on the Edge, Scrape-Off Layer, and Divertor Plasma in DIII-D – 194

Roiger, Richard J.
An Artificial Intelligence Classification Tool and Its Application to Gamma-Ray Bursts – 215

Roithmayr, Carlos M.
Contributions of Spherical Harmonics to Magnetic and Gravitational Fields – 165

Rolli, S.
Search for New Particles at CDF II – 178

Romisch, Stefania
Multibeam Phased Array Antennas – 191

Rondineau, Sebastien
Multibeam Phased Array Antennas – 191

Rosario-Castro, Belinda I.
Attachment of Single-wall Carbon Nanotubes (SWNTs) on Platinum Surfaces by Self-Assembling Techniques – 22

Rosen, Micha
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Rosen, R. S.
Quench Sensitivity of Hot Extruded 6061-T6 and 6069-T6 Aluminum Alloys – 34

Recent Developments in Understanding Five-Power-Law Creep in Metals – 32

Rosenstein, Barry S.
ATM Mutations and the Development of Severe Radiation-Induced Morbidity Following Radiotherapy for Breast Cancer – 123

Screening for ATM Mutations in an African-American Population to Identify a Predictor of Breast Cancer Susceptibility – 122

Rose-Pehrsson, Susan L.
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

Rossbach, S.
Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Rossin, R.
CDF Silicon Vertex Detector for Run II – 177

Roth, Mary Ellen
Development of a Dynamic, End-to-End Free Piston Stirling Convertor Model – 17

Rothman, Laurence S.
High-Resolution Spectroscopic Database for the NASA Earth Observing System Program – 157

Rubel, Glenn O.
Brillouin Spectroscopy Data Base for Biological Threats – 205

Rubenchik, A. M.
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

Russell, Valerie
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Ryerson, F. J.
Pyrochlore-Rich Titanate Ceramics for the Immobilization of Plutonium: Redox Effects on Phase Equilibria in Cerium- and Thorium- Substituted Analogs – 36

Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

Sabol, Chris
Atmospheric Density Dynamics and the Motion of Satellites – 12

Systematic Effects in Color Photometry Data – 13

Saeks, Richard E.
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Saffari, B.
Complementary Pairs of Multilinear Polynomials – 150

Sakari, P.
Communication Channel in Urban Operations: A First Survey – 42

Sakharov, V. I.
Corrugated and Composite Nozzle-Inlets for Thrust and Noise Benefits – 6

Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Salasovich, Rich
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Sall, James L.
The Effect of Prostate Cancer Support Groups on Uncertainty – 138

Sallustio, John
National Institute of Justice Center Requirements Definition, Technical Assistance, Agile Test and Evaluation and Cyber Science Analysis – 159

Sampayan, S.
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

Sanders, William R.
Future Combat Systems Command and Control (FCS C2) Human Functions Assessment: Interim Report - Experiment 3 – 159

Sandusky, Robert
A Program of Research and Education to Advance the Design, Synthesis, and Optimization of Aero-Space System Concepts – 206

Saric, William S.
Pulsed-Sound Measurements of the Influence of High- Amplitude Noise on Boundary-Layer Transition to Turbulence – 181

Sasaki, M.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Sastry, S. V. K.
Journal of Spacecraft Technology – 16

Satcher, J. H.
Shock Propagation and Instability Structures in Compressed Silica Aerogels – 172

Satogata, T.
Remote Operations in a Global Accelerator Network – 149

Saturno, William
Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

Savin, D. W.
Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Fe(q+) Ions – 193

Schaeffler, Michelle
Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Schafer, K. J.
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Schanze, Kirk S.
Conjugated Polyelectrolytes: Synthesis and Applications – 28

Scharlemann, E. T.
Modeling of Long-Range Atmospheric Lasercom Links Between Static and Mobile Platforms – 188

Schillaci, Jane F.
Evaluation of 'Healthy Beginnings'; Fort Carson's Pregnancy Physical Training Program – 110

Schiller, Lee H., Jr
A Study of Prescription Non-Compliance Womack Army Medical Center – 90

Schmalzel, John
An Architecture for Intelligent Systems Based on Smart Sensors – 11

Schmalzer, P.
Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

Schmid, B.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Schmid, G. J.
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

Schoenlein, R. W.
Ultrafast X-Ray Science at the Advanced Light Source – 171

Schoettle, B.
LED Headlamps: Glare and Color Rendering – 146

Scholasch, Thibaut
Remote Sensing of Vineyard FPAR, with Implications for Irrigation Scheduling – 66

Schoneboom, Bruce A.
Neuro-Immune Mechanisms in Response to Venezuelan Equine Encephalitis Virus Infection – 135

Schrader, Jeffrey L.
A Double-Blind Randomized Placebo Controlled Trial of Magnesium Oxide for Alleviation of Chronic Low Back Pain – 137

Schuh, C. A.
Connectivity in Random Grain Boundary Networks – 33

Schuh, C.
Gas Pressure Forming of Titanium Alloys and Composites by Transformation Superplasticity – 31

Internal Stress Plasticity-Creep Due to Dynamic Hydrogen Gradients in Ti-6A14V – 19

Schumann, Johann
A Tool for Verification and Validation of Neural Network Based Adaptive Controllers for High Assurance Systems – 162

Adding Assurance to Automatically Generated Code – 161

Scodellaro, L.
Search for New Phenomena in CDF – 178

Scott, Sarah J.
Distributed Electrical Power Generation: Summary of Alternative Available Technologies – 68

Scully, J. R.
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

Seehra, M. S.
Quantification of Mercury in Flue Gas Emission using Boron-doped Diamond Electrochemistry – 73

Segre, P. N.
Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

Sen, Subhayu
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

Sepehrnoori, K.
New Generation Chemical Flooding Simulator. Semi-Annual Report for the Period September 1, 2001-February 28, 2002 – 154

Serban, R.
PVODE Trio: PVODE, KINSOL, and IDA – 154

Serio, Mike
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Sethian, J. D.
Development of a Hibachi Window for Electron Beam Transmission in a KrF Laser – 186

Sever, Thomas L.
Putting us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape – 67

Sextro, R. G.
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Shaffer, Richard A.
One-Year Follow-Up Evaluation of the Sexually Transmitted Disease/Human Immunodeficiency Virus Intervention Program in a Marine Corps Sample – 118

Shah, K. S.
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

Shah, R. K.
Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

Shah, Sandeep
Wing Leading Edge Debris Analysis – 7

Shahin, Susan
Polymerase Chain Reaction for the Rapid Detection of Burkholderia pseudomallei – 84

Shapiro, H. S.
Complementary Pairs of Multilinear Polynomials – 150

Shapiro, Irwin I.
Exotic Molecules in Space: A Coordinated Astronomical Laboratory and Theoretical Study – 214

Sheehy, B.
Calculations of Strong Field Mulitphoton Processes in Alkali Metal Atoms – 174

Shekhar, P. V.
Endothelial Cell Morphogenesis and Angiogenesis Mediated by Carbohydrate-Binding Protein Galectin-3 – 105

Shen, Mo-wei
A Study on Visual Search and Selection of Pull-down Menu – 83

Shen, Yong-lin
Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Shendell, D. G.
Assessment of Organic Compound Exposures, Thermal Comfort Parameters, and HVAC System-Driven Air Exchange Rates in Public School Portable Classrooms in California – 70

Sheplak, M.
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Shepley, D.
Inductively Coupled Plasma Mass Spectrometery Uranium Error Propagation – 28

Sherman, David A.
Case Study of Satellite TRICARE Clinic for Wilford Hall Medical Center – 127

Sherman, Larry S.
Role of CD44 in Malignant Peripheral Nerve Sheath Tumor Growth and Metastasis – 93

Sherman, M. H.
Reducing Indoor Residential Exposures to Outdoor Pollutants – 69

Shestakov, A. I.
Using Pseudo Transient Continuation and the Finite Element Method to Solve the Nonlinear Poisson-Boltzmann Equation – 27

Shi, Peng
An Introduction to Bayesian Belief Networks and their Applications to Land Operations – 166

Shi, Qiang
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Shiau, D. A.
Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Shibata, K.
A General Relativistic Magnetohydrodynamics Simulation of Jet Formation with a State Transition – 195

Shih, Ie-Ming
Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 1 - Molecular Characterization of Ovarian Serous Tumors Developing Along Different Pathways – 93

Shillingford, Jonathan M.
The Role of the Tyrosine Kinase JAK2 in the Development and Progression of Breast Cancer – 109

Shkelev, E.I.
Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

Shlesinger, Michael F.
Science and Technology Text Mining: Nonlinear Dynamics – 203

Shoemaker, Patrick
Biological and Silicon Modeling of Moving Target Detection in Insects – 59

Shrivastava, S.
Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

Shroll, Robert M.
User's Manual for SAG-2 SHARC/SAMM Atmosphere Generator – 75

Shvets, A. I.
Shock Waves Mitigation at Blunt Bodies Using Needles and Shells Against a Supersonic Flow – 54

Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Sibille, Laurent
Microgravity Materials Research and Code U ISRU – 39

Sidhu, Sukdeep
Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-dependent Enzymes Revealed by Human Pyruvate Dehydrogenase – 27

Silva, C.
Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Silver, Eric
Laboratory Astrophysics using a Microcalorimeter and Bragg Crystal Spectrometer on an Electron Beam Ion Trap – 210

Simmons, D. W.
Stability of ClO2 as a Product of Gas Phase Decontamination Treatments – 38

Simon, H.
Bipartite Graph Partitioning and Data Clustering – 149

Simon, Sindee L.
Residual Stresses in Thermosetting Resins for Polymer Matrix Composites: Modeling and Effects on Long Term Performance – 181

Simon, Theodore
An XMM Study of Low-Activity Coronal Stars of 1-2 Solar Masses – 214

Simpson, A.
Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

Simpson, Roger L.
The Near-Wall Behavior of Unsteady Vortical Flow Around the Tip of an Axial Pump Rotor Blade – 57

Singhal, Surendra N.
Overview of Future of Probabilistic Methods and RMSL Technology and the Probabilistic Methods Education Initiative for the US Army at the SAE G-11 Meeting – 202

Sirbu, M.
Delay Estimation in Long-Code Asynchronous DS/CDMA Systems Using Multiple Antennas – 43

Sittler, E.
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Sittler, Edward C., Jr.
Semiempirical Two-Dimensional Magnetohydrodynamic Model of the Solar Corona and Interplanetary Medium – 224

Sivak, M.
LED Headlamps: Glare and Color Rendering – 146

Sjoegreen, Bjoern
High Order Filter Methods for Shock/Turbulence MHD Flows – 53

Skidmore, T. E.
Performance Evaluation of O-Rings in the SAFKEG 3940A Package in KAMS (U) – 227

Skoch, Gary J.
Experimental Investigation of Centrifugal Compressor Stabilization Techniques – 9

Skokova, Kristina
Arc Jet Testing of Carbon Phenolic for Mars Sample Return and Future NASA Missions – 217

Slane, Patrick
Probing for Pulsars in XMM Study of the Composite SNRS G327.1-1.1 and CTA 1 – 209

Slavin, J.
The Nature of the Vela Supernova Remnant as Revealed by O VI and C IV Absorption – 207

Slavin, Jonathan D.
High Velocity Gas in the Line of Sight to the Vela SNR – 211

Shocked Clouds in the Vela Supernova Remnant – 206

Slife, Harry
Telechemistry Projecting Laboratory Expertise to a Deployed TAML – 47

Slywezak, Richard A.
Low-Earth-Orbit Satellite Internet Protocol Communications Concept and Design – 14

Smart, L.
Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Smith, D. D.
Coherence Phenomena in Coupled Optical Resonators – 190

Smith, David D.
Characteristic Matrices for Spherical Shell Photonic Systems – 188

Smith, Grego
Schedule Risk Assessment – 169

Smith, J. N.
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

Smith, Yoland
Kainate Receptors in the Striatum: Implications for Excitotoxicity in Huntington's Disease – 108

Snapp, R. R.
Ad hoc Query Support for Very Large Simulation Mesh Data: The Metadata Approach – 153

Snell, E. H.
Marangoni Convection and Deviations from Maxwells' Evaporation Model – 55

Snodgrass, Joshua
Systematic Effects in Color Photometry Data – 13

Soderman, Paul T.
Acoustic Quality of the 40- by 80- Foot Wind Tunnel Test Section After Installation of a Deep Acoustic Lining – 10

Sokhansanj, B. A.
Interpreting Microarray Data to Build Models of Microbial Genetic Regulation Networks – 85

Solberg, Alison T.
Differences in the Onset and Severity of Symptoms of Malignant Hyperthermia With Different Inhalational Anesthetics – 136

Solina, Franc
Electrotechnical Review – 40

Soltz, R.
Protron Reaction Cross Sections Measured in the BNL/AGS E943 Experiment – 184

Song, Jin-Ping
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Spahr, Timothy
Astrometric and Photometric Follow-Up of Faint Near Earth Objects – 220

Spann, J. F.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Sparkman, O. D.
Perspectives on Pentaerythritol Tetranitrate (PETN) Decomposition – 20

Springfellow, Guy
Exotic Molecules in Space: A Coordinated Astronomical Laboratory and Theoretical Study – 214

Squire, Tom
Behavior of HfB2-SiC Materials in Simulated Re-Entry Environments – 18

Sridhar, M. S.
Journal of Spacecraft Technology – 16

Stackpoole, Mairead
Ceramic Foams from Pre-Ceramic Polymer Routes for Reusable Acreage Thermal Protection System Applications – 22

Materials Science Work at NASA Ames Research Center – 30

Staggs, M.
Time-resolved Spectroscopic Investigation of Emission Observed During Damage in the Bulk of Fused Silica and DKDP Crystals – 176

Stander, Valerie A.
Self-Definition as a Survivor of Childhood Sexual Abuse Among Navy Recruits – 119

Stander, Valerie
Research on Child Abuse in the US Armed Forces – 120

Stanford, Malcolm K.
Friction and Wear Characteristics of Cu-4Al Foil Bearing Coating at 25 and 650 degree C – 62

Starr, Colin
An Introduction to Bayesian Belief Networks and their Applications to Land Operations – 166

St.Cyr, O. C.
Three-Dimensional Coronal Density Structure: 1. Model – 223

Stefanescu, Doru M.
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition – 23

Steich, D. J.
TIGER LDRD – 170

Stein, Seth
Andean Mountain Building: An Integrated Topographic, GPS, Seismological and Numerical Study – 74

Steincamp, Jim
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Steinetz, Bruce
Nonlinear Oscillations and Flow of Gas Within Closed and Open Conical Resonators – 182

Stelflug, Bradley W.
The Minimum Effective Dose of Lidocaine Needed to Block Evoked Potentials in the Sciatic Nerve of the Rat – 137

Stepanov, A.V.
Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

Stephens, Karen
Quest: A New Approach to Molecular Staging of Tumors – 125

Stephens, R. B.
WO21.3 Direct Drive Reentrant Cone Targets for Fast Ignition – 192

Ster, Branko
Latched Recurrent Neural Network – 163

Sterne, P. A.
Short Range Chemcial Ordering in Bulk Metallic Glasses – 37

Stevens, Douglas E.
A Delphi Study Executive Skills 2010: A Toolbox of Competencies for Air Force Medical Service Corps Officers of the 21st Century – 140

Stewart, Susan H.
NASA Langley Scientific and Technical Information Output-2002 – 201

Stickle, Douglas R.
Malignants In The Body Politic: Redefining War Through Metaphor – 128

Stockpoole, Mairead
Ceramic Foams for TPS Applications – 15

Stoehr, A.
Optoelectronic Components and Integration Devices: From Concepts to Applications – 50

Stone, James R.
Jet Noise Modeling for Supersonic Business Jet Application – 9

Storgards, J.
Helsinki University of Technology Deparment of Electrical and Communications Engineering, Electron Physics Laboratory Annual Report 2001 – 171

Strapp, Walter
Ice Particle Impact on Cloud Water Content Instrumentation – 58

Strawa, A. W.
Airborne Cavity Ring-Down Measurement of Aerosol Extinction and Scattering During the Aerosol IOP – 76

Stroemberg, D.
Platforms in Networks: Software Architecture and Operator Services – 41

Struk, Peter M.
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

Stuhmiller, James H.
A Health Hazard Assessment for Blast Overpressure Exposures – 104

Sture, S.
Physics of Regolith Impacts in Microgravity Experiment (PRIME) – 219

Su, Bao-hui
Study on Increasing Bioactivity of Hydroxy-poly-calcium Sodium Phosphate Appatite Modified by Cold Plasma Technique – 145

Su, Hong-Yu
Space Medicine and Medical Engineering – 140

Su, Shuang-Ning
Space Medicine and Medical Engineering – 140

Sullivan, Donna
Officer Street-to-Fleet Database: Expanding Capabilities – 205

Sun, Jian Q.
Stochastic Optimal Control via Bellman's Principle – 164

Sun, Xi-Qing
Development and Application of Self-powered Short Arm Human Centrifuge – 141

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Space Medicine and Medical Engineering – 140

Sun, Yang
Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Susitaival, R.
Load Balancing by MPLS in Differentiated Services Networks – 43

Susnik, Rudolf
Lattice Based Coding Schemes – 169

Sutter, David W.
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Sutton, T. M.
Implementation of Chord Length Sampling for Transport through a Binary Stochastic Mixture – 180

Suykerbuyk, Robert A.
AMEDD Wide Chronic Disease Management Network with a Prototype Management System for Diabetes – 128

Svizhenko, Alexei
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Swain, D. W.
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Swartz, Douglas A.
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Sweeney, Mattew
Development of a Valve-Less Meso-Scale Pump – 63

Swingle, M. R.
Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase-5 – 84

Takayasu, M.
ITER CS Model Coil and CS Insert Test Results – 177

Tang, N.
Using Data Mining to Find Bent-double Galaxies in the FIRST Survey – 207

Tanigaki, M.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Tankosic, D.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Tannenbaum, M. J.
Negative Binomial Fits to Multiplicity Distributions from Central Collisions of (16)O+Cu at 14.6A GeV/c and Intermittency – 167

Tao, Rong
A Study on Visual Search and Selection of Pull-down Menu – 83

Tarter, C. B.
Inertial Fusion and High-Energy-Density Science in the USA – 195

Tasic, Jurij
Context Dependent Digital Image Shape Coding – 58

Tatchyn, R. O.
Computational Simulations of High Intensity X-Ray Interaction – 20

Taylor, R.
Design and Characterization of MEMS Optical Microphone for Aeroacoustic Measurement – 52

Tennant, Allyn F.
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Terrill, P.
Joining Uranium to Aluminum Using Electron Beam Welding and an Explosively Clad Niobium Interlayer – 31

Testa, Vincenzo
Chandra X-Ray Observatory Observations of the Globular Cluster M28 and its Milisecond Pulsar PSR B1821-24 – 213

Thatcher, T. L.
Effect of Penetration Factor, Deposition, and Environmental Factors on the Indoor concentration of PM23.5 Sulfate, Nitrate, and Carbon – 72

Theofylaktos, Noulle
Field Effect Transistor Behavior in Electrospun Polyaniline/Polyethylene Oxide Nanofibers – 197

Thibeault, Sheila
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Thomas, James D.
Far Forward Battlefield Telemedicine: Ultrasonic Guidance in Diagnosis and Emergency Therapeutics – 87

Thomas, Rickey P.
The Effect of NEXRAD Image Looping and National Convective Weather Forecast Product on Pilot Decision Making in the Use of a Cockpit Weather Information Display – 4

Thompson, B.
Coronal Magnetic Field Topology and Source of Fast Solar Wind – 224

Thompson, C. A.
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

Thompson, S. L.
INCCA: Integrated Climate and Carbon – 79

Thompson, T.
Long-Term Pavement Performance Information Management System. Pavement Performance Database User Guide – 202

Thomsen, Cynthia J.
Child Sexual Abuse and Number of Sexual Partners in Young Women: The Role of Abuse Severity Coping Style and Sexual Functioning – 119

Thyagarajan, K.
Journal of Spacecraft Technology – 16

Ticar, Igor
Skin Effect Impact on Current Density Distibution in OPGW Cables – 49

Tierney, B.
Netest: A Tool to Measure the Maximum Burst Size, Available Bandwidth and Achievable Throughput – 147

Titus, P.
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Toint, P. L.
Interior-Point l1-Penality Method for Nonlinear Optimization – 168

Tomazic, Saso
Lattice Based Coding Schemes – 169

Tomon, John J.
Digital Mammography Breast Dosimetry Using Copper- Doped Lithium Fluoride (LiF:MCP) Thermoluminescent Dosimeters (TLDs) – 136

Tonda-Goldstein, Sylvie
Optical Beamforming Networks for Radars and Electronic Warfare Applications – 45

Optical Processing of Microwave Signals – 50

Topsakal, E.
Properties of Materials for Designing Filters at Optical Frequencies – 190

Tormalm, M.
TurMMAC Afterbody Application Challenge – 1

Torres, R. A.
KDP Impurity Data – 178

Tran, T.
CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Trent, J. W.
NIF PEPC Mechanical Test Stand Safety Note – 191

Trevino, Luis
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Trimble, D.
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

Tropeano, Anne
Marine Corps En Route Care System (ERCS): Development of Patient Treatment and Supply Requirements – 118

Trucco, Massimo
New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes – 115

Tsap, L. V.
Feedback From Video From Virtual Reality Navigation – 154

Tshiteya, Rene
Science and Technology Text Mining: Nonlinear Dynamics – 203

Tsimhoni, O.
Time-Sharing of a Visual In-Vehicle Task While Driving: Finding from the Task Occlusion Method – 146

Tucholski, Edward J.
Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

Tudisco, O.
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

Tuitele, Barbara A.
The Current Practices in Injury Prevention and Safety Helmet Use in an Air Force Medical Center – 133

Turchi, Peter J.
Transport in Plasma Thrusters Using Complex Propellants – 17

Turk, G.
Image-Driven Mesh Optimization – 149

Turner, Mark G.
High-Fidelity Three-Dimensional Simulation of the GE90 – 2

Turner, Travis L.
Analysis of SMA Hybrid Composite Structures using Commercial Codes – 64

Design, Fabrication, and Testing of SMA Enabled Adaptive Chevrons for Jet Noise Reduction – 23

Tzou, H. S.
Distributed Control of Nonlinear Aircraft Structures Including Aerodynamic and Temperature Interactions – 8

Uebelhart, Scott A.
Performance and Reliability Optimization for Aerospace Systems subject to Uncertainty and Degradation – 206

Ulrickson, M. A.
Advanced Tokamak Plasmas in the Fusion Ignition Research Experiment – 195

Unger, S.
Handling Irreducible Loops: Optimized Node Splitting vs DJ-Graphs – 154

Unruh, Charles L.
A Business Case Analysis of the Special Care Unit at Moncrief Army Community Hospital – 91

Urpo, S.
Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

Usher, Stacy E.
Effects of Pregnancy on the Army Physical Fitness Test – 125

Van De Walle, Steven P.
Reducing Length of Stay at the Wilford Hall Medical Center Emergency Department Using Computer Simulation – 130

van den Berg, M. L.
Superconducting Detector Endstation for High-Resolution Energy-Dispersive SR-XRF – 173

Van Loef, E. V.
Fast, High Light Output Scintillator for Gamma Ray and Neutron Detection – 179

vanderBliek, Nicole
NOAO/NSO Newsletter – 218

Vanderpool, Celia
Centennial of Flight Educational Outreach – 227

vanderWoerd, Mark
DNA in a Tunnel: A Comfy Spot for Recognition - or -The Structure of BsoBI Complexed with DNA. What can we Learn about Function via Structure Determination and how can this be Applied to Bone or Muscle Biology? – 86

VanKonynenburg, R.
Saturation of Impurity-Rich Phases in a Cerium-Substituted Pyrochlore-Rich Titanate Ceramic: Part 1. Experimental Results – 36

Vap, Jason C.
Model and Design of a Constant Modulation Current Bias Circuit for Measuring the Small Signal Response of Semiconductor Lasers – 61

Vassallo, P.
Measurement of Gas and Liquid Velocities in an Air-Water Two-Phase Flow using Cross-Correlation of Signals from a Double Sensor Hot-Film Probe – 55

Vaught, C.
Emergency Communication Triangle – 46

Vemuri, R.
Performance of Neural Networks Methods in Intrusion Detection – 161

Venenga, Dana G.
Texas Children's Bicycle Helmet Bill Analysis – 147

Venet, Arnaud
Static Analysis of C Programs – 164

Venkateswaralu, A.
Journal of Spacecraft Technology – 16

Venkateswaran, S.
Implementation of Finite Rate Chemistry Capability in OVERFLOW – 52

Veres, Josphe P.
High-Fidelity Three-Dimensional Simulation of the GE90 – 2

Vetter, K.
Position Resolution Studies with MSU 32-Fold Segmented HPGe Detector – 173

Vilas, Faith
Vesta's UV Lightcurve: Hemispheric Variation in Brightness and Spectral Reversal – 217

Vilas, F.
Space Weathering: An Ultraviolet Indicator – 217

Villacampa, A.
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

Vine, Frances J.
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube – 196

Vineiso, C. J.
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Viskochil, David H.
Genetic Evaluation of Peripheral Nerve Sheath Tumors in Neurofibromatosis Type I – 114

Vitalis, Antonios
The Role of Solar and UV Radiation in Environmental Stress Assessment – 216

Vlasek, Karisa
Aerospace Workforce Development: The Nebraska Proposal; and Native View Connections: A Multi-Consortium Workforce Development Proposal – 201

Volakis, J. L.
Properties of Materials for Designing Filters at Optical Frequencies – 190

Volz, Martin
Semiconductor Crystal Growth in Static and Rotating Magnetic fields – 197

Vu, Nicole T.
The Formation of Ethanol in Postmortem Tissues – 25

Waern, A.
Communication Channel in Urban Operations: A First Survey – 42

Walch, S.
Computational Nanoelectronics: Applications to DNA, Carbon Nanotubes and Nanotransistors – 48

Waldmann, Johannes
Match-bounded String Rewriting Systems – 155

Wallace, L.
Deposition Rates of Fine and Coarse Particles in Residential Buildings: Literature Review and Measurements in an Occupied Townhouse – 70

Wallin, S.
TurMMAC Afterbody Application Challenge – 1

Wang, C. A.
AlGaAsSb/GaSb Distributed Bragg Reflectors Grown by Organometallic Vapor Phase Epitaxy – 198

Measurement of the Auger Recombination Rate in p-Type 0. 54-eV GaInAsSb by Time-Resolved Photoluminence – 198

Organometallic Vapor Phase Epitaxy of n-GaSb and n-GaSb and n-GaInAsSb for Low Resistance Ohmic Contacts – 197

Recombination Parameters for Antimonide-Based Semiconductors using RF Photoreflection Techniques – 198

Recombination Parameters in InGaSb Epitaxial Layers for Thermophotovoltaic Applications – 51

Wang, Hong
+Gz Protection of a New Bladder Anti-G System – 140

Wang, Hong-wu
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Wang, Qiong
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Wang, Xian-Min
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

Space Medicine and Medical Engineering – 140

Wang, Xin-Xing
Study on Mitochondrial Membrane Mechanism of Rat Heart Injury Induced by Constraining Stress – 143

Wang, Yuan
Air-Cooled Design of a Temperature-Swing Adsorption Compressor for Closed-Loop Air Revitalization Systems – 61

Wang, Yue-qi
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Wang, Yu-lan
Characteristics of Human Body Dynamic Responses to Landing Impact in Supine Position – 142

Wang, Yu-qing
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Wang, Zheng-rong
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Wang, Zhi-jie
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Warell, J.
Properties of the Hermean Regolith – 220

Washington, C.
Spike-Nosed Bodies and Forward Injected Jets in Supersonic Flow – 54

Washington, Thomas
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Watson, J. Kevin
The Effects of an Unsteady Reduced Gravity Environment on the Soldering Process – 30

Watt, Gerald D.
Electrochemical Reconstitution of Biomolecules for Applications as Electrocatalysts for the Bionanofuel Cell – 29

Weast, Brad
Measuring Cultural Change - A Management Focused Approach To Improving The Safety Culture – 112

Weber, Richard
Microgravity Studies of Liquid-Liquid Phase Transitions in Alumina-Yttria Melts – 30

Weeks, B. L.
Probing Interactions in Complex Molecular Systems through Ordered Assembly – 26

Weese, R. K.
Kinetics of the Beta Delta Solid Phase Transition of HMX, Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine – 27

Weese, R.
CTE and Ratchet Growth Measurements on LX17-1 and Constituents – 19

Wegman, Edward J.
Intrusion Detection Using Data Mining Techniques – 60

Wei, Jing-Han
Differential Visual Attention Scales Directed by Location Versus Semantic Cue – 142

Wei, Jin-he
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Wei, Jin-He
Space Medicine and Medical Engineering – 140

Wei, Ying-Bo
Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Weiner, Louis M.
Targeting Breast Cancer With Anti HER2/neu Diabodies – 105

Weir, John
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Welch, Clara L.
Space-based Science Operations Grid Prototype – 158

Wells, B. Earl
Applying a Genetic Algorithm to Reconfigurable Hardware – 165

Weltz, Christina R.
A Randomized Prospective Trial Comparing Paravertebral Block and General Anesthesia for Operative Treatment of Breast Cancer – 106

Welzer, Tatjana
Procedure for Estimation of Error-rate of Classification Algorithms – 202

Wendt, J. O. L.
NOx, Fine Particle and Toxic Metal Emissions from the Combustion of Sewage Sludge/Coal Mixtures: A Systematic Assessment – 72

Werkema, D. D.
Laboratory and Field Results Linking High Bulk Conductivities to the Microbial Degradation of Petroleum Hydrocarbons – 26

Werner, Juliane M.
Phase II: Laboratory Investigation of Portable Instruments for Submarine Air Monitoring – 76

Wertz, Julie
Reliability and Productivity Modeling for the Optimization of Separated Spacecraft Interferometers – 157

West, E. A.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

West, Larry T.
Mapping Surface Soil Organic Carbon for Crop Fields with Remote Sensing – 66

Wheater, S.
Middleware Support for Non-Repudiable Transactional Information Sharing between Enterprises – 42

Whelan, Timothy J.
Development and Evaluation of Computer-Based Versions of the Decision Board for Early Breast Cancer – 113

White, D. A.
TIGER LDRD – 170

White, Edward B.
Instrumentation for Wind Tunnel Transient Growth Studies – 4

White, John E.
Nondestructive Evaluation of Aircraft and Spacecraft Wiring – 5

Whitlock, Warren L.
Phase II-SOF Knowledge Coupler-Based Phase I XML Schema – 116

Whittenberger, J. Daniel
Elevated Temperature Deformation of Fe-39.8Al and Fe-15.6Mn-39.4Al – 34

Wiggins, Alton R.
A Description of the Management Characteristics of Anesthesia Care Delivery in Small, Medium, Large, Teaching and Non-Teaching Hospitals in the U.S. Navy – 135

Wignarajah, Kanapathipillai
Development of a Plastic Melt Waste Compactor for Space Missions Experiments and Prototype Design – 17

Wignarajah, K.
An Evaluation of the Functionality of Advanced Fuel Research Prototype Dry Pyrolyzer for Destruction of Solid Wastes – 62

Wilhelm, Robert J.
A Process Analysis of the Uniform Chart of Accounts Personnel Utilization System – 203

Wilkins, P. R.
Nanosecond Frame Cameras – 48

Wilks, S. C.
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

Williams, Barry R.
Quantitative Infrared Reference Library. Library 2 – 204

Williams, C.
Investigation of Vacuum Insulator Surface Dielectric Strength with Nanosecond Pulses – 173

Williams, D. B.
Evolution of the Segregation Behavior of Alloying Elements in a Low-Alloy Steel – 33

Williams, G. G.
LOTIS Upper Limits and the Prompt OT from GRB 990123 – 207

Super-LOTIS Early Time Optical Counterpart Measurements – 212

Williams, G.
Prompt GRB Optical Follow-up Experiments – 213

Williams, Morgan
NRA8-21 Cycle 2 RBCC Turbopump Risk Reduction – 55

Williams, P.
Efficient and Exact Visibility Sorting of Zoo-Mesh Data Sets – 165

Williams, Stephen D.
Cyclin Dependent Kinase Inhibitors as Targets in Ovarian Cancer – 94

Williamson, Richard A.
Accuracy of the Universal Portable Anesthesia Complete Drawover Vaporizer When Using the Anesthesia Simulator – 132

Wilson, Clay
Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress – 162

Wilson, Edward
Motion-Based System Identification and Fault Detection and Isolation Technologies for Thruster Controlled Spacecraft – 156

Winter, J. W.
Study of Cost Effective Large Advanced Pressurized Water Reactors that Employ Passive Safety Features – 205

Wire, G. L.
Fatigue Crack Propagation from Notched Specimens of 304 SS in an Elevated Temperature Aqueous Environment – 33

Wiser, R.
Learning by Doing: The Evolution of State Support for Photovoltaics – 68

Wissmann, Julie
AusGeo News – 68

Witherow, W. K.
Radiation Pressure Measurements on Micron-Size Individual Dust Grains – 176

Witte, Joel
An Investigation Relating Longitudinal Pilot- Induced Oscillation Tendency Ratings to Describing Function Predictions for Rate-Limited Actuators (Project MAX GAP) – 3

Wodtke, A. M.
Large Amplitude Vibrational Influence on Electron Transfer Reactions – 60

Wojcik, Joanna
Signal Transduction in Regulation of Autocrin HGF Expression in Breast Cancer Metastasis – 99

Wolozin, Benjamin
Mechanisms of a-Synuclein Aggregation and Toxicity – 107

Wright, A. D.
Design of Controls to Attenuate Loads in the Controls Advanced Research Turbine – 1

Wu, T. C.
Pathogenesis of Ovarian Serous Carcinoma as the Basis for Immunologic Directed Diagnosis and Treatment. Project 3 - Development of Antigen-Specific Cancer Vaccines for the Control of Ovarian Cancer – 91

Wu, Yan-Hong
Development and Application of Self-powered Short Arm Human Centrifuge – 141

Xia, J.
Parametric Stud of Flow and Heat Transfer in a Slag Cleaning Furnace – 18

Two Simplified Approaches to Flow and Heat Transfer in Electric Furnaces – 18

Xiao, Hui
The Linear Dimensions of Human Body Measurements of Chinese Male Pilots in Standing Posture – 141

Xiao, Jing
Encapsulated ANP cDNA Transfection Cells Attenuate Hypertension in Hypertensive Rats – 84

Xiao, Zhi-Jun
Space Medicine and Medical Engineering – 140

Xie, Hong
Cone Model for Halo CMEs: Application to Space Weather Forecasting – 78

Xie, Hong-tao
Development of Data Acquisition Card in Exercise-ECG Detection System – 144

Xie, Ming
Ballistic Impact of Braided Composites With a Soft Projectile – 62

Xu, Guo-Dong
Blood Oxygen and Lactate Concentrations in Skeletal Muscles During Exercise – 142

Xu, X. Q.
Turbulence Simulations of X-point Physics on the L-H Transitions – 192

Xu, Yan
+Gz Protection of a New Bladder Anti-G System – 140

Yamaguchi, T.
Magnetic Moment of Proton Drip-Line Nucleus (9)C – 183

Spin Polarization of Mg-23 in Mg-24 + Au, Cu and Al Collisions at 91 A MeV – 180

Yan, Gui-Ding
+Gz Protection of a New Bladder Anti-G System – 140

Yan, Ru-Quan
Cardiovascular Effect of Positive Pressure Breathing Using G-suits with Different Bladder Coverage – 143

Yan, X. Y.
Magnetospheric Magnetic Reconnection with Southward IMF by a 3D EMPM Simulation – 74

Yang, Chang-Bin
Development and Application of Self-powered Short Arm Human Centrifuge – 141

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Yang, Chang-Lin
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Yang, U. M.
hypre: A Library of High Performance Preconditioners – 153

Yang, Yu-Hua
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Yao, Yong-Jie
Development and Application of Self-powered Short Arm Human Centrifuge – 141

Effects of +Gz Exposure Time on Memory and Behavior in Rats – 143

Yasuda, O.
Summary of Working Group 2 – 199

Yee, H. C.
High Order Filter Methods for Shock/Turbulence MHD Flows – 53

Yi, Chang-Rong
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Ylae-Jaeaeski, A.
Proceedings of the Seminar on Internetworking 28-29.4. 2003. Mobile Networks based on IP Protocols and Unlicensed Radio Spectrum – 148

Yoo, A. B.
Characteristics of Workload on ASCI Blue-Pacific at Lawrence Livermore National Laboratory – 151

Younes, W.
Tables of Neutron-induced Fission Cross Sections for Various Pu, U, and Th Isotopes, Deduced from Measured Fission Probabilities – 173

Young, G. A.
Factors Affecting the Hydrogen Environment Assisted Cracking Resistance of an Al-Zn-Mg-(Cu) Alloy – 32

Young, Larry A.
Initial Efforts toward Mission-Representative Imaging Surveys from Aerial Explorers – 218

Young, R. A.
Horizontal Path Laser Communications Employing MEMS Adaptive Optics Correction – 188

Yu, Hong
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Yu, Tian-hua
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Zaitsev, V.V.
Solar Millimeter Wave Bursts: Time-Frequency Analysis – 211

Zajc, Baldomir
Electrotechnical Review – 40

Zaletelj, Janez
Video Object Shape Coding Using Control Point Optimization – 59

Zerbini, M.
ECE Diagnostic of High Temperature ECRH Heated Plasmas on FTU – 192

Zerovnik, Janez
An algorithm for the Asymmetric Traveling Salesman Problem – 168

Zha, H.
Bipartite Graph Partitioning and Data Clustering – 149

Zhan, Hao
Effects of Nutritional Intervention on Brain Functions and Its Related Biochemical Indexes in Mice Exposed to High +Gy – 141

Zhang, Guo-Dong
Fundamental Investigation on Processing of High Performance Covalent Ceramic Nanocomposites by Polymer Precursor Pyrolysis – 38

Zhang, Xue-xue
Analysis of Heat Transfer in Skin Tissues Subjected to Hot Water – 144

Zhao, De-ming
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Zhao, Lun
Effect of Extremely Low Frequency Magnetic Field on the Focal Brain Injury in Rats – 83

Zhao, Ya-Li
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Zheng, Jian-Quan
Effect of Microwave Irradiation on ATPase Activity and Voltage Dependent Ion Channel of Rat Hippocampus Cell Membrane – 144

Zhou, Yi-xin
Measurement and Analysis of Operation Performance of the 'Endocare' Cryoprobe System – 145

Zhu, Dongming
Thermal Conductivity and Water Vapor Stability of HfO2-based Ceramic Coating Materials – 54

Zisman, M. S.
Neutrino Factory R&D in the U.S – 171

Zumer, Viljem
An algorithm for the Asymmetric Traveling Salesman Problem – 168

Zunec, Miro
Skin Effect Impact on Current Density Distibution in OPGW Cables – 49

Zurbuchen, Thomas H.
Understanding the Solar Sources of In Situ Observations – 226

Zypman, Fredy R.
Generalization of Equivalent Crystal Theory to Include Angular Dependence – 34